

### **Bare-NP Adverbials and Adjunct Extraction \***

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"A special place to eat and drink." That sign on a local restaurant brought to my attention the issue of Bare-NP Adverbials. I knew what they really meant was "a special place to eat and drink *at*," or even "a special place *at which* to eat and drink," but somehow, even without the preposition, the phrase "a special place" was functioning adverbially. Clearly, the management didn't mean for people to somehow physically eat and drink the restaurant itself! After I'd noticed the restaurant sign, I became more aware of Bare-NP Adverbials (BNPAs) like the one on the sign in contexts other than infinitival relative clauses. There are also finite BNPA relative clauses, and of course BNPAs that don't occur in a relative clause at all. BNPA structures aren't limited to those denoting place; they can involve expressions of time, manner or reason as well. A few representative examples are shown below:

- (1)   a. Infinitival relative: "the day to meet"  
      b. Finite relative: "the reason (that) I called"

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\* Thanks to Bob Kasper, Craig Roberts, and Bob Levine for their useful suggestions on earlier drafts of this paper. It has been much improved as a result of their comments. Remaining errors are, of course, my own.

- c. "Regular" BNPA: "Practice this way."

In this paper, I offer an HPSG-style treatment of BNPA's that builds on previous treatments of BNPA's while providing greater coverage of some phenomena that other researchers have not (to my knowledge) addressed. In section 1, I briefly present the prime facts about BNPA's that any explanation needs to deal with. In section 2, I present the views of Larson (1983, 1985, 1987) and Kasper (1998) on BNPA's, and in the following two sections propose my own explanations for additional BNPA-related facts that Larson and Kasper do not examine. In section 5, I address adjunct extraction, an issue that must be faced before any serious account of BNPA's can be made complete. In section 6, I present an HPSG-style framework in which to carry out my synthesis of and additions to previous approaches, employing the adjunct extraction constraints presented in section 5.

## 1 The facts reviewed

One of the easiest observations to make about BNPA's is that only a few nouns are eligible to head them. Consider the data in (2), which includes some ungrammatical BNPA's with the good ones. The data consist of infinitival relative clauses, although the results are equally valid for other BNPA constructions (with some exceptions noted in section 3).

- (2)
- a. a place/spot to stay
  - b. \*a location to stay
  - c. a place to go
  - d. \*a location to go
  - e. a time to die
- (Note: also with *day, year, hour, moment*, etc.)
- f. \*a period to die
  - g. a way to talk
  - h. \*a manner to talk
  - i. a reason to stay
  - j. \*a purpose to stay

The distinction is clearly neither syntactic nor semantic, since two identical structures, say (2a) and (2b), with nearly synonymous heads (*place, location*) can differ in grammaticality. Larson (1983, 1985, 1987) presents similar data and judgments; especially informative is chapter 2 of his 1983 dissertation. BNPA's of direction (*They went that way*) and duration of time (*We stayed there six days*) are possible, but the remainder of this paper will not be focusing on them.

## 2 Previous explanations

### 2.1 Larson (1983, 1985, 1987)

Given data like those in (2), Larson reasonably moves for a lexical solution. He proposes that the selected words that can head BNPA's assign a case to themselves, instead of having it assigned to them by a verb or preposition. Specifically, (according to the most recent version of his explanation) they optionally self-assign a general "Oblique" case, which can then be further specified as +TEMP(oral), +LOC(ation), +DIR(ection) or +MAN(ner), depending on the context (Larson 1985, 1987). With case thus assigned, a BNPA is allowed to take its place in a sentence. (This explanation varies slightly from that in Larson (1983), in which he has BNPA's subordinate to prepositionless PP nodes). Furthermore, with case assigned, BNPA words can participate in adverbial relative clauses in the same way that ordinary words with, say, an +ACC case-marking can participate in an object-modifying relative clause (as in *a book to read*). The optionality of this case-marking keeps open the possibility of using BNPA words in non-adverbial relative clauses, as in *the place we visited*.

Larson does not propose an Oblique case of +REASON, and in fact, treats BNPA adverbials with *reason* separately from the others. In other words, Larson would maintain that (2i, j) really don't belong with the rest of the data in (2), even though they seem to have the very same structure. Strange as such a claim might sound, Larson actually presents convincing evidence for it, and ultimately recommends treating a phrase like *the reason (that/why) I left* similarly to *the claim (that) I left*, or *the decision (whether) to go*: as an NP plus a complement, with the twist that *why* is classified as a complementizer instead of a relativizer like all its *wh*-friends. Of course, *the reason I left* and *the claim that I left* are semantically different in that in the latter, the clause *I left* identifies the claim, while in the former, *I left* is the result of the reason. However, Larson points out that there can, in fact, be a "complex-NP" reading of a *reason* NP, as seen in the following contrast:

- (3) (from Larson (1983), (94))
- a. I left for the same reason that John left.
  - b. I left for the simple reason that John left.

In sentence (3b), *John left* identifies the reason, just as *I left* identifies the claim in *the claim that I left*. To account for the two different ways of interpreting a head-complement phrase headed by *reason*, Larson attributes the relative-clause meaning (as in (3a)), to the entire relative clause construction (Larson 1983), an approach that parallels Sag's (1997) treatment of relative clauses, which will be described in section 6.

## 2.2 Kasper (1998)

Kasper also puts forth a lexically-based explanation of BNPA's, showing how they can be handled by his general treatment of "recursive modification" in HPSG. One of the claimed advantages of Kasper's system is the ability to represent words that have the same basic meaning as a single definition, even though they may behave quite differently depending on syntactic usage. The prime example of these different-behaving but same-meaning words is attributive vs. predicative adjectives. While Pollard and Sag (1994) would treat an attributive and predicative version of the same adjective as two homophonous lexical entries, Kasper's formalization allows both usages to be contained in a single (underspecified) entry. Kasper then shows how his scheme could be applied to other modifiers, including adverbs and (the relevant part for our purposes) BNPA words, which, like attributive and predicative adjectives, have basically the same meaning wherever they appear, but make radically different meaning contributions depending on how they are used. For instance, *place* always has the same basic meaning of "place," even though it functions as a direct object in *Search the place* and as an adverb in *live someplace*. The basic, constant meaning is what Kasper calls a sign's ICONT (mnemonic for *internal content*), while the ECONT (*external content*) carries the more specific meaning contribution that will depend on how the sign is used.

An example will be helpful at this point. Kasper gives a general template for locative BNPA heads, which can be used to represent BNPA words of place or time. This template is shown in (4), but has been specified so that it represents *place*:

(4) HPSG specification for *place* (adapted from Kasper (1998))

$$\left[ \begin{array}{l} \text{HEAD} | \text{MOD} \left[ \begin{array}{l} \text{ARG} | \text{CONT} [4] \left[ \begin{array}{l} \text{psoa} \\ \text{LOCATION} [3] \end{array} \right] \\ \text{ICONT} | \text{INDEX} [3] \\ \text{ECONT} [4] \end{array} \right] \vee \text{none} \\ \text{CONT} \left[ \begin{array}{l} \text{place} \\ \text{INDEX} [1] \\ \text{RESTR} | \text{INST} [1] \end{array} \right] \end{array} \right]$$

Notice first that Kasper gives a disjunctive MOD value for a BNPA lexical head, one disjunct of which is *none*. This disjunction allows a word like *place* to be used either as a modifier, as when it occurs in a BNPA, or as a regular noun, as when it appears as a normal subject or object. Here we will concentrate on the first disjunct, to see how a VP is modified. It will be noticed first that MOD has been split up into three features, one of which is the ICONT that was mentioned above. The reason ICONT is tucked away inside

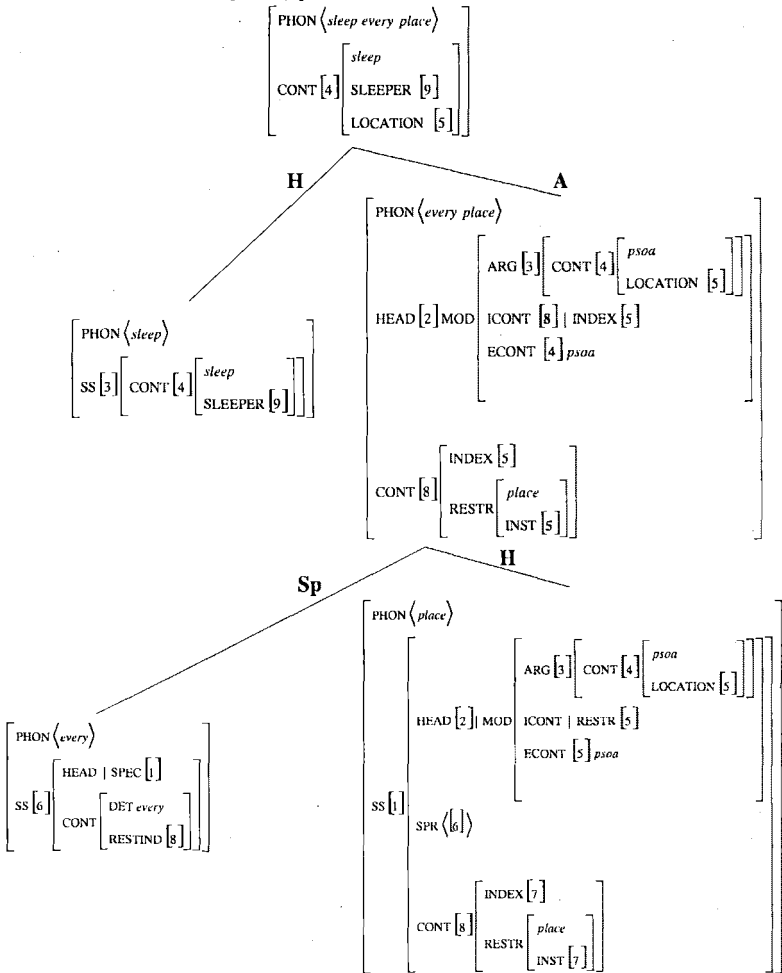
the MOD value is that it is part of Kasper's means of handling recursive modification, which does not concern us directly here. All we need to know right now is that the ICONT for this word will be the same as the CONT, which contains the "place" meaning. The ARG feature, meanwhile, serves the same purpose as MOD used to do all by itself: it keeps track of what is being modified. In this case, if something is being modified, it will have to be a *psoa* (*parametrized state of affairs*) -- in other words, a VP. As for the ECONT, whose job is to combine the basic content of *place* with the content of whatever is modified, its value here is [4]: the same VP as is being modified, except that the feature LOCATION has now been filled in with the variable from ICONT|INDEX. Thus, *place* has preserved its individual meaning in its ICONT value, and still made an adverbial contribution by way of its ECONT specification. The only trouble now is ensuring that this ECONT value becomes the CONT for the entire phrase. As the Semantics Principle is currently stated, the CONT of a head-adjunct phrase will be that of its adjunct daughter. But the CONT for *place* is not what we want; we want its ECONT. Therefore, Kasper restates the Semantics Principle as shown in (5), with the phrase's CONT coming from the adjunct daughter's ECONT. Note also the identification of the adjunct daughter's ICONT with its CONT. This structure sharing happens only at the phrase-daughter level, to allow for recursion. If the lexical entry for *place* had decreed that its ICONT and CONT were the same, trouble would arise in cases where adverbial *place* is modified, as in *They stayed every known place*.

(5) Semantics Principle for Head-Adjunct phrases (Kasper (1998))

$$\begin{array}{c} \text{ADJUNCT DAUGHTER} \end{array} \quad \begin{array}{c} \text{HEAD DAUGHTER} \end{array}$$

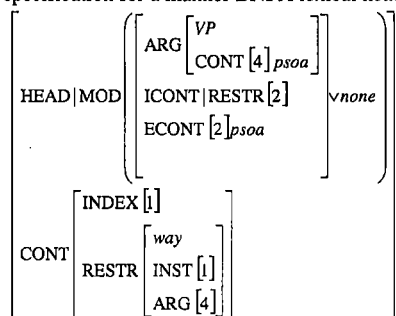
$$\left[ \begin{array}{c} \textit{hd-adj-struct} \\ \text{HEAD [1]} \\ \text{CONT [2]} \end{array} \right] \Rightarrow \left[ \begin{array}{c} \text{HEAD | MOD} \left[ \begin{array}{c} \text{ARG [4]} \\ \text{ICONT [3]} \\ \text{ECONT [2]} \end{array} \right] \\ \text{CONT [3]} \end{array} \right] \quad [4] \left[ \begin{array}{c} \text{HEAD [1]} \\ \text{CONT [5]} \end{array} \right]$$

At this point we are ready to dissect *sleep every place*, whose phrase structure tree appears in (6). The lexical entry for *place* is for the most part copied from (4). The phrase *every place* is much the same as for the word *place*, but now the Semantics Principle comes into effect, identifying the CONT with the ICONT, shown by the boldface tag [8] on ICONT. As a result of this identification, the INDEX and RESTR|INST values in the CONT are now identified with the [5] from ICONT|INDEX. This is also shown with a boldface tag. Finally, the entire phrase has CONT [4], the same as the ECONT for *every place*, with roles for SLEEPER and LOCATION specified.

(6) Derivation for *sleep every place*

Though Kasper does not address BNPA's of manner, they could be handled similarly. Below is a lexical specification for *way*:

(7) HPSG specification for a manner BNPA lexical head



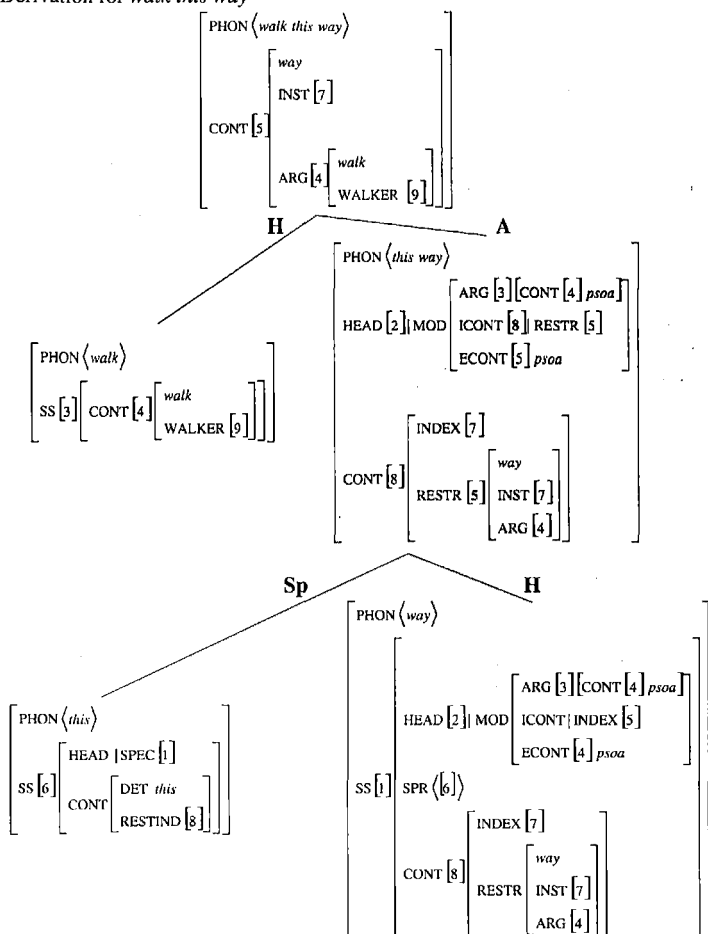
Here, the CONT of the modified VP, [4], is affected differently from the way seen above. Rather than sharing its LOCATION value with way's ICONT, it submits its entire CONT to be the ARGUMENT for the CONT|RESTR of way. By the Semantics Principle, this CONT will be equated with way's ICONT, [2], which is also the value of ECONT, which is ultimately the content of the entire head-adjunct phrase. An example using this lexical entry (*walk this way*) appears in (8) on the following page. The phrase *this way* structure-shares its ICONT with its CONT, again shown by the boldfaced tag [8]. A boldface [5] shows the consequent sharing of the RESTR value between ICONT and CONT. By the lexical specification for way, this RESTR [5] is the same as the ECONT. This value becomes the value for the entire phrase *walk this way*.

Two ways of lexically specifying BNPA words have been given in (4) and (7). What do they have in common? In other words, what unites these specifications such that words like *place*, *day* and *way* can be considered a distinct family of words? The answer is: the disjunctive MOD value. For adverbs, the only appropriate MOD value will be a bundle of the features ARG, ICONT and ECONT. For most nouns the only appropriate value for MOD will be *none*. But for adjectives, and the select set of nouns that can act as BNPA lexical heads, the lexical entry will have a disjunction, with one disjunct being the ARG-ICONT-ECONT bundle and the other being *none*. The distinction between adjectives and BNPA words is that for a BNPA lexical head, the nonempty MOD disjunct has ARG:VP instead of ARG:N'. As it turns out, this definition of the lexical marking of BNPA heads will need to be modified slightly after adjunct extraction has been discussed, but the basic idea will remain the same.

Some may take issue with the specific semantic wiring chosen for BNPA adverbials. For example, place and time adverbials add information to a VP's content, while a manner adverbial takes that entire content as its argument. One could argue for having manner adverbials fill in a MANNER attribute within the VP's CONT, or

conversely, having time and place adverbials act as semantic functors with the modified VP as an argument. Whether one agrees with the treatment shown here, or chooses one of the two just mentioned, or opts for a different one entirely does not matter. It is a word's disjunctive MOD specification, not the specifics of its semantic contribution, that determine its membership in the BNPA family.

(8) Derivation for *walk this way*





In fact, that last thought should be emphasized: *A word is not just a BNPA word when its MOD value is nonempty.* If it has the disjunctive MOD value of the type discussed here, it will have the properties of BNPA words even if its MOD is *none*. To illustrate, consider the verb *behave*, which subcategorizes for an adverbial. In a phrase like *behave this way*, as Bob Levine (p.c.) points out, the MOD value for *this way* is *none*. Even so, it is being used without a preposition, because *way* is a BNPA word. In all the data that will be explored in sections 3 and 4, it will make no difference whether the chosen verb subcategorizes for a place or manner (or theoretically, temporal) adverbial or not. These facts are just further evidence that BNPA's are a lexical phenomenon, not a syntactic or semantic one.

### 2.3 In summary: advantages and drawbacks

Both Larson and Kasper have useful ingredients in their solutions. Each treats BNPA's on a lexical basis, which is the most reasonable tack to take; and each has some mechanism by which a BNPA can specify another thematic role in a VP's content, which is something that will have to take place somehow in any explanation. Larson's story has an advantage over Kasper's in that it takes into account the peculiar behavior of *reason* in BNPA constructions (which we'll look at shortly), and specifically puts forth a separate account for it. Kasper's has an advantage over Larson's in that it is formally more rigorous. However, neither account explains *all* the data about BNPA behavior; it is to these unexplained phenomena that I now turn.

## 3 Non-relative BNPA's: Not just any determiner is allowed

### 3.1 Overview

The first aspect of BNPA's that previous explanations fail to capture is that even the words that can function as BNPA's cannot do so entirely freely. Specifically, not just any determiner can combine with a BNPA word, as is shown in (9), below. Note that with some phrases containing *place*, there is a corresponding lexicalized form, specifically, *someplace*, *everyplace*, and *noplace*. These lexicalizations cause confusion in that they are often acceptable where their phrasal counterparts are not; for example, *Kim lived someplace* is fine, while *Kim lived some place* is questionable. More will be said about this issue later, but in reviewing the grammaticality judgments in (9a), the distinction between these phrases and their lexical counterparts should be borne in mind.

- |                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>(9) a. <i>place</i></p> <ul style="list-style-type: none"> <li>i. *Kim lived a place</li> <li>ii. *Kim lived the place</li> <li>iii. ?Kim lived some place</li> <li>iv. ?Kim lived every place</li> </ul> | <p>b. <i>day</i> (or <i>time</i>, <i>night</i>, <i>year</i>, <i>hour</i>, <i>Monday</i>, etc.)</p> <ul style="list-style-type: none"> <li>i. *Kim sang a day</li> <li>ii. *Kim sang the day</li> <li>iii. *Kim sang some day</li> <li>iv. Kim sang every day</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- |                              |                            |
|------------------------------|----------------------------|
| v. ?Kim lived no place       | v. ?Kim sang no day        |
| vi. *Kim lived this place    | vi. Kim sang this day      |
| vii. *Kim lived that place   | vii. Kim sang that day     |
| viii. *Kim lived my place    | viii. ?Kim sang my day     |
| ix. Kim lived many places    | ix. Kim sang many days     |
| x. Kim lived two places      | x. ?Kim sang two days      |
| xi. What place did Kim live? | xi. What day did Kim sing? |

c. *way*

- i. \*Kim slept a way
- ii. \*Kim slept the way
- iii. ?Kim slept some way
- iv. Kim slept every way
- v. \*Kim slept no way
- vi. Kim slept this way
- vii. Kim slept that way
- viii. Kim slept my way
- ix. Kim slept many ways
- x. Kim slept two ways
- xi. What way did Kim sleep?

d. *reason*

- i. \*Kim stayed a reason
- ii. \*Kim stayed the reason
- iii. \*Kim stayed some reason
- iv. \*Kim stayed every reason
- v. \*Kim stayed no reason
- vi. \*Kim stayed this reason
- vii. \*Kim stayed that reason
- viii. \*Kim stayed my reason
- ix. \*Kim stayed many reasons
- x. \*Kim stayed two reasons
- xi. ?What reason did Kim stay?

3.2 A non-problem: the *reason* data

Some of the data above can be dismissed out of hand: the data in (6d) can be handled without any explanation beyond that provided by Larson. Larson (1983) predicts that no (non-relative) BNPA's are possible with *reason*, simply because *reason* doesn't have the lexical permission slip to act as an adverb the way *place*, *way* and time words do (as mentioned in section 2.1). His prediction, as verified in (6d), is true for the most part. A problem arises with (9d.xi), which Larson predicts should be ungrammatical. But in some dialects, it is acceptable, and even in my dialect (where it is unacceptable), it is not quite as bad as the other *reason* BNPA's.

There are two ways to explain the possible grammaticality of (9d.xi). One is to go back and give *reason* permission to participate in BNPA expressions, but then we are faced with explaining the ungrammaticality of (9d.i-x), as well as re-explaining all the facts that motivated Larson's explanation in the first place.

The second way is just to say that the collocation *What reason* has itself acquired the meaning of *why*. This "lexical wastebasket" solution might not be as unpalatable as it sounds, since at least one other language appears to have done exactly the same thing. Consider the sentence in (10), from ChiNdali, a Bantu language spoken in Malawi (Stewart (1997)):

- (10) Chifukwa chili ndangabuka munyumba?  
 chi-fukwa chi-li n- ta- 0- nga-buka mu-ny-umba  
 7-reason 7-which 1sg-Neg-Pres-can-go 18-9-house  
 "Why can't I go into the house?"

*Chifukwa chili* "reason which" is translated as "Why," which shows that such a relexicalization is not unprecedented. (Note furthermore that the phrase here is working as a BNPA: there is no affix or adposition to change the NP into an adverb.) This example is also further crosslinguistic evidence of a basic difference between reason adverbs and the others. Specifically, in ChiNdali, the first element of a sentence -- whether or not it is the verb's subject -- in most cases must agree grammatically with the verb. These initial phrases can include locatives (indeed, locatives are the focus of Stewart (1997)). When a reason adverbial phrase is fronted, however, there is no agreement with the verb; the only agreement seen here is the noun-class agreement within the phrase (showing that this noun belongs to class 7), manifested in the *chi-* prefixes.

I have no strong preference for this last solution or the previous one, and will not attempt to choose one of them here. The important finding is that Larson's 1983 account, with some minor additions, successfully explains the behavior of *reason* with the various determiners; therefore, my attempts at explanation need not cover this ground.

### 3.3 A real problem: the rest of the data

The BNPAs of place, time and manner are more difficult to explain. However, before an attempt is made to explain all the unacceptable determiner+BNPA combinations, it should be noted that in some cases, the utterances sound bad even with a preposition, as seen in (11):

- (11) a. *place*  
 i. \*Kim lived a place / \*Kim lived in a place  
 ii. \*Kim lived the place / \*Kim lived in the place<sup>1</sup>  
 iii. ?Kim lived some place / ?Kim lived in some place  
 iv. ?Kim lived every place / ?Kim lived in every place  
 v. ?Kim lived no place / ?Kim lived in no place  
 b. *day (or time, night, year, hour, Monday, etc.)*  
 i. \*Kim sang a day / \*Kim sang on a day  
 ii. \*Kim sang the day / \*Kim sang on the day<sup>2</sup>

<sup>1</sup> *Kim lived in the place* is actually acceptable when it is an instance of epithet anaphora, for example, in response to *Has Kim ever been to Columbus?* However, since outside such a context this sentence is ungrammatical, I have marked it as such in this data set.

<sup>2</sup> Likewise, I have marked *Kim sang on the day* as ungrammatical, even though it might not be so bad in some dialects if in response to a question like *What did Kim do on her birthday?*

- iii. \*Kim sang some day / \*Kim sang on some day
- v. ?Kim sang no day / ?Kim sang on no day
- viii. ?Kim sang my day / ?Kim sang on my day

c. *way*

- i. \*Kim slept a way / \*Kim slept in a way
- ii. \*Kim slept the way / \*Kim slept in the way
- iii. ?Kim slept some way / ?Kim slept in some way
- v. \*Kim slept no way / \*Kim slept in no way

There is a good possibility, then, that the badness of BNPs in (11) is not really our problem. Perhaps whatever explains why the prepositional adverbials here are no good will account for the corresponding BNPs as well. Such an explanation would probably not be syntactic, since both BNPs and PPs are occurring in the exact same sentence structures here. A semantic explanation is not impossible, but will be difficult to formulate, given the different behavior of the same determiner in different types of adverbials as seen above. Therefore, a pragmatic explanation might be a reasonable hypothesis. However, although there is some tantalizing evidence supporting a pragmatic approach, in the end there are too many unanswered questions to claim this issue can be resolved pragmatically.

In support of a pragmatic explanation, there is the data in (12). As can be seen, in most cases the addition of some context improves the situation.

(12) a. *place*

- i. \*Kim lived a place that I liked to visit / Kim lived in a place that I liked to visit
- ii. \*Kim lived the place that I liked to visit / Kim lived in the place that I liked to visit
- iii. Kim lived some place that I liked to visit / Kim lived in some place that I liked to visit
- iv. Kim lived every place that I liked to visit / Kim lived in every place that I liked to visit
- v. Kim lived no place that I liked to visit / Kim lived in no place that I liked to visit

b. *day (or time, night, year, hour, Monday, etc.)*

- i. Kim sang a day that I remember well / Kim sang on a day that I remember well
- ii. Kim sang the day that I remember well / Kim sang on the day that I remember well
- iii. ?Kim sang some day that I remember well / ?Kim sang on some day that I remember well
- v. ?Kim sang no day that I remember well / ?Kim sang on no day that I remember well

viii. ?Kim sang my day, which was Saturday / ?Kim sang on my day, which was Saturday

c. way

- i. Kim slept a way that I recommended / Kim slept in a way that I recommended
- ii. Kim slept the way that I recommended / Kim slept in the way that I recommended
- iii. Kim slept some way that I recommended / Kim slept in some way that I recommended
- v. Kim slept no way that I recommended / Kim slept in no way that I recommended

Some of the above data makes sense. For example, sentences with the indefinite article such as *\*Kim lived (in) a place* could reasonably be deemed infelicitous because they are so uninformative: Kim's living at all entails that there is some place where she lived. But even here, there is already evidence against a pragmatic approach, in that there are some cases where having more context does not improve the sentence (the first sentences in 12a.i-ii, and the sentences in 12b.iii, v, viii, though judgments vary). Furthermore, a pragmatic explanation cannot easily explain why the definite articles in (11) would be infelicitous in the first place. To use a *place* example again, *\*Kim lived the place* should be a perfectly informative sentence, since saying that Kim lived does not entail that she lived in some particular known place.

Of course, even if all the sentences in (12) were improved by context, there are still the determiners that were omitted in (11), some of which do not fit the pattern of matching grammaticality between BNPA's and PPs. For example, in *place* adverbials, *this*, *that* and possessives sound bad only with BNPA's, but improve when a preposition is present (13a-c). Just the opposite occurs in (13d): *every* in a time adverbial. As can be seen, *every* is fine in a time BNPA, but adding a preposition actually decreases its acceptability:

- (13)
- a. \*Kim lived this place / Kim lived in this place
  - b. \*Kim lived that place / Kim lived in that place
  - c. \*Kim lived my place / Kim lived in my place
  - d. Kim sang every day / ?Kim sang on every day

A pragmatic explanation would have nothing to say about the data in (13).

All these factors are grounds for not adopting a pragmatic explanation for what determiners can appear in BNPA's. Not even the slippery distinction between *every place* and *everyplace* (and the corresponding forms with *some* and *no*) can be turned into a basis for an explanation: such an explanation would, after all, only apply to *place* adverbials.

### 3.4 Emerging conclusion: *place* BNPA's are different

Even though it has been determined above that syntactic, and, so far, pragmatic accounts will not be able to clarify the situation with determiners and BNPA's, there is still something that can be salvaged from the data examined in (9-14). All in all, *place* BNPA's are turning out to behave somewhat differently from those of time or manner. Notice that the determiners shown in (13) are all in *place* BNPA's, and recall that in (12), it was only the *place* adverbials that were unquestionably not improved by the addition of context. Thus, the most cautious conclusion is that *place* BNPA's simply cannot be formed with *a*, *the*, *this*, *that*, and possibly possessive determiners<sup>3</sup>. Why this should be the case is an open question, but it is evidence that *place* BNPA's are somehow different from other kinds.

### 3.5 A final complication

Before moving to section 4, one last wrinkle must be noted. In the case of *the*, there are a very few situations in which it can be used in a *place* BNPA (example 14b due to Levine (p.c.)):

- (14) a. Kim lived the same place that Sandy did.  
b. Kim lived the only/one place that she could afford.

This fact seems to point to a semantic explanation for why *the* (and perhaps *a*, *this*, and *that*) cannot be used in *place* BNPA's, but on the other hand, data like those in (13) show that semantics alone cannot fully explain the situation. Therefore, I suspect that the final account will manage to identify some common semantic property of *this*, *that*, *a*, and *the* (but not *the same*), which will be incorporated into a lexical constraint on the word *place* that forbids it to select determiners having this property.

## 4 Relative BNPA's: Some prepositions aren't optional -- they're forbidden!

<sup>3</sup> There is a clean explanation for one item in (13): the anomalous \**Kim stayed my place*. This sentence can be explained in terms of the specialized meaning of *place* to mean 'dwelling, home' when it appears after a possessive. If it is accepted that there are two lexical entries for *place*: *place1* with the more general meaning and BNPA eligibility, and *place2* with the specialized 'home' meaning and no BNPA eligibility -- then it makes perfect sense that \**Kim stayed my place2* should be ungrammatical, since *place2* is not a BNPA word. Implicit in this claim is the prediction that with sufficient context, *Kim stayed my place1* would be grammatical. Unfortunately, *place2* seems to have quite a strong claim to the territory following a possessive, and it is difficult to construct a context strong enough to make a listener hear a phrase like *my place as my place1* instead of *my place2*. For this reason, such a hypothesis is hard to test, but in any case, it cannot be disputed that *place* does indeed have the specialized meaning of 'home' following a possessive, and it is not unreasonable that this separate meaning could have a separate, non-BNPA-eligible lexical entry. Of course, even if the preceding explanation is true, it is still possible that *my* is also forbidden by whatever factor disallows *a*, *the*, *this*, and *that*.

#### 4.1 Overview

The other aspect of BNPA behavior that previous treatments fail to address concerns BNPA's in relative clauses. As can be seen in (15), some bare adverbial relative clauses not only are able to survive without a preposition at the end, but actually forbid one to be there. That is, in some cases, a BNPA version of a relative clause exists alongside the version that has a preposition (15a, b), and in some cases the BNPA version is the only option (15c-h):

- (15) a. the place to stay (at)
- b. no place we stayed (at)
- c. any day to sing (\*on)
- d. what day we sang (\*on)
- e. every way to speak (\*in)
- f. the way you speak (\*in)
- g. no reason to go (\*for)
- h. two reasons she went (\*for)

Neither Larson nor Kasper makes any provision to rule out stranding for any of the head nouns seen above. In fact, Larson (1983: 44-45) claims that "any NP which can appear as the object of a preposition" can head up a bare adverbial relative with a stranded preposition, which the data in (15) directly contradict.

#### 4.2 Cruising the BARs

As we begin to look for an explanation for this problem, the first thing to notice is that preposition stranding in adverbial relatives (like the determiners in section 3) is not really a pure BNPA issue: even though we declared *reason* not to be a BNPA word, it is behaving like one in disallowing preposition stranding. Therefore, a unified explanation of the data in (15) cannot be put entirely in terms of BNPA words. Instead, we will need to refer to a class of words that have in common whatever it is that unites *reason* with the BNPA words. That common trait, I suggest, is the ability to be modified by a bare adverbial relative clause (i.e., one without an overt relativizer, like those in (15)), and I accordingly call this set the set of B(are) A(dverbial) R(ative) words. BAR words suggest a canonical adverbial relation that holds with respect to the verb that occurs in the adverbial relative clause. For example, the phrase *the place we stayed* can never be interpreted as *the place why we stayed*; it has to be interpreted as something like *the place where we stayed*. Likewise, *the day the music died* has to be interpreted *the day when the music died*. Recognizing this family of words has the advantage of filling in a hole in Larson's explanation of *reason* adverbials. Recall that he pointed out two possible readings for the phrase *reason (that) Bill left*: one was the true adverbial reading, and the other was the "complex-NP" reading (more easily gotten when the phrase appears as *the simple reason that ...*). However, the situation as Larson left it would seem to allow the

analogous *claim that Bill left* also to have two readings, one of which was some kind of adverbial reading instead of the correct complex-NP reading. If *reason* is in a separate class of words that allow the formation of these bare adverbial relatives, nothing more need be said about other complex NPs.

To clinch the status of BNPA words as a subset of BAR words, consider the fact that for non-BAR words (for instance, *cat*), there can be no BNPA, no matter what adverbial relation it bears to the verb, as seen in (16):

- |      |                                 |                                  |                        |
|------|---------------------------------|----------------------------------|------------------------|
| (16) | a. modified by a BAR            | b. used in a BNPA                |                        |
|      | i. a cat to live *(with)        | i. I lived *(with) a cat.        | <i>Accompaniment</i>   |
|      | ii. a cat to talk *(to)         | ii. I talked *(to) a cat.        | <i>Benefactive (?)</i> |
|      | iii. a cat to buy food *(for)   | iii. I bought food *(for) a cat. | <i>Benefactive</i>     |
|      | iv. a cat to give the toy *(to) | iv. I gave a toy *(to) a cat.    | <i>Indirect object</i> |
|      | v. a cat to clean up *(after)   | v. I cleaned up *(after) a cat.  | <i>Other</i>           |

Since BNPA's are a subset of BAR words, describing when prepositions can be stranded in bare adverbial relative clauses will automatically cover preposition-stranding in adverbial relative clauses with bare NPs. Such a description follows in section 4.3.

### 4.3 A rule for preposition-stranding

A reasonable question that could be asked about the data in (15) is whether it is truly a property of BAR words that they forbid preposition stranding in non-place adverbials, or whether the ungrammaticality of (15c-h) is related to what determiner appears with the BAR word, or whether the relative adverbial is finite (*the place we stayed*) or infinitival (*the place to stay*), or the semantics of the VP in the following relative clauses. In fact, the type of determiner does not seem to bear on the grammaticality of a bare adverbial relative. Even *a* and *the*, which behaved so differently from other determiners in non-relative BNPA's, follow the same patterns as the other determiners when it comes to preposition stranding. (The examples in this section will use *a*, *the*, and *every*, but the results also hold for *no*, *some*, *this*, *that*, cardinal numbers and possessives.) Nor did infinitival status have an effect on grammaticality. (The examples to follow use infinitival BARs, but the results apply also to finite BARs.) Concerning the semantics of the VP, several factors were tested: whether the VP had an "implicit" argument of place, time, or manner; whether it was telic or atelic; and whether it consisted of a single verb. Though these tests do not exhaust the ways of semantically classifying VPs, the tests that were done do suggest that BAR words have an inherent property that affects preposition stranding with them.

Before the "implicit argument" hypothesis can be tested, "implicit argument" should be defined. Since in many (if not most) sentences, there is a place and time in which the event takes place, it could be said that most verbs already have implicit



arguments of place and time. Nevertheless, for a verb like *stay*, there is a tighter link to the idea of location. One useful criterion for capturing this kind of implicit argumenthood is whether it is possible to define the verb without referring to the idea of location or time. As it turns out, there are very few verbs that satisfy this definition. For an implicit argument of place, *stay* may be the only relevant verb. For an implicit argument of time, the best examples are *be early/late*. For manner, there is *behave*. (Of course, with *behave*, a manner adverbial is an explicit as well as implicit argument.) The test results are shown in (17).

- (17) A. Implicit argument of place: *stay*
- i. Determiner *a*
    - a. a place to stay at
    - b. \*a day to stay on
    - c. \*a way to stay in
  - ii. Determiner *the*
    - a. the place to stay at
    - b. \*the day to stay on
    - c. \*the way to stay in
  - iii. Determiner *every*
    - a. every place to stay at
    - b. \*every day to stay on
    - c. \*every way to stay in
- B. Implicit argument of time: *be late*
- i. Determiner *a*
    - a. \*a place to be late at
    - b. ?a day to be late on
    - c. \*a way to be late in
  - ii. Determiner *the*
    - a. \*the place to be late at
    - b. ?the day to be late on
    - c. \*the way to be late in
  - iii. Determiner *every*
    - a. \*every place to be late at
    - b. ?every day to be late on
    - c. \*every way to be late in
- C. Implicit argument of manner: *behave*<sup>4</sup>
- i. Determiner *a*
    - a. ?a place to behave well at
    - b. ?a day to behave well on

<sup>4</sup> Since *behave* requires an explicit argument of manner, it has been provided one (*well*) in the place and time BARs.

- c. \*a way to behave in
- ii. Determiner *the*
  - a. ?the place to behave well at
  - b. ?the day to behave well on
  - c. \*the way to behave in
- iii. Determiner *every*
  - a. ?every place to behave well at
  - b. \*every day to behave well on
  - c. \*every way to behave in

Though having an implicit argument of time does seem to help the time BARs (they are questionable, but not outright wrong), there are two reasons that this cannot be the explanation we are looking for. First, the manner adverbials are not improved at all when a verb with an implicit argument of manner (*behave*) is used. Second, with place BARs, some verbs that do not have an implicit place argument are not ungrammatical; for example, *?a place to behave well at*, as seen in (14.C.i.a), and *a place to eat at*, as discussed at the beginning of this paper.

Telicity likewise does not hold the key to accounting for preposition stranding with BAR words. Whether a verb is telic or atelic, it may be good in some BARs, and bad in others, as seen in (18):

- (18) A. Telic verb: *die*
- i. Determiner *a*
    - a. a place to die at
    - b. ?a day to die on
    - c. \*a way to die in
  - ii. Determiner *the*
    - a. the place to die at
    - b. ?the day to die on
    - c. \*the way to die in
  - iii. Determiner *every*
    - a. every place to die at
    - b. ?every day to die on
    - c. \*every way to die in
- B. Atelic verb: *sleep*
- i. Determiner *a*
    - a. a place to sleep at
    - b. ?a day to sleep on
    - c. \*a way to sleep in
  - ii. Determiner *the*
    - a. the place to sleep at
    - b. ?the day to sleep on

- c. \*the way to sleep in
- iii. Determiner *every*
  - a. every place to sleep at
  - b. ?every day to sleep on
  - c. \*every way to sleep in

The pattern that is emerging is that manner BARs cannot have stranded prepositions, while place and time BARs sometimes can. This pattern is also borne out when controlling for single- or multiple-word VPs, though this test has not been shown. Put another way, stranded prepositions in BARs must denote physical or temporal location. Such a constraint correctly rules out all the stranded prepositions in manner BARs, and allows for stranded prepositions to be grammatical in place and time BARs. It can be encoded as shown in (19):

(19) Rule for preposition stranding in relative adverbials

$$\left[ \begin{array}{l} \text{HEAD } \textit{prep} \\ \text{COMPS } \left\langle \left[ \begin{array}{l} \textit{gap-ss} \\ \text{BAR } + \end{array} \right] \right\rangle \end{array} \right] \Rightarrow [\text{CONT } \textit{nom-obj}]$$

This constraint states that if a preposition is stranded by a BAR word (in other words, has a BAR+ gap-synsem as its complement), then that preposition must have a nominal object as its content (i.e., must denote spatiotemporal location).

Now, according to (19), all preposition stranding in place or time BARs should be acceptable. It will not rule out the questionable or ungrammatical examples of stranded prepositions in place or time BARs, such as *\*a place to sing at*, or *\*the day to swim on*. Nonetheless, I believe the constraint stated in (19) is on the right track for two reasons. First, it does filter out the stranded prepositions in manner BARs, which are uniformly bad. Second, many of the judgments of ungrammaticality in place or time BARs are more open to dispute. Some people will judge them as completely grammatical, others as completely ungrammatical, and others take the position that, "I wouldn't say it myself, but I would understand it." This suggests that other factors are at work which we should not expect the syntactic/semantic rule above to capture. (For those who categorically reject time BARs with stranded prepositions, (19) could be refined to have the content of the preposition denote physical locations only.)

Now that the issues of determiners and preposition stranding have been addressed at least to the point of getting the facts right, we can start to formalize how BNPA's will be handled. To do that, though, we need to settle another vexing issue: adjunct extraction.

## 5 Adjunct extraction

### 5.1 Complements and adjuncts

Much has been written over several decades on what the proper definition of complements and adjuncts should be. The most basic rule of thumb is that a complement is an element that is required to be present by some word or phrase (a verb, in our case), while an adjunct is optional. This rule, however, quickly runs into trouble when a verb like *eat* is considered: sometimes it takes a direct object, and sometimes it does not. Since direct objects are considered one of the most prototypical examples of complements, it would seem that for *eat*, a direct object is an optional complement. Conversely, adverbs are considered some of the most prototypical adjuncts, but there are the rare verbs that require an adverb to follow them: *treat*, *behave*. Thus, the adverbs in these cases are usually deemed complements. There are other diagnostics for determining whether a phrase is an adjunct or a complement (iterability, nature of semantic contribution, among others), but none has yet been able to give foolproof results in all cases. Here, too, an ultimate definition that distinguishes adjuncts from complements will not be attempted (though a syntactic diagnostic will be used to distinguish the two categories in English); instead, the focus will be on extracting them.

### 5.2 Adjunct extraction *is* extraction

Extraction is the term used, even in non-transformational approaches, to denote the kind of filler-gap dependency seen in sentences like *Who do you like?* *Like* is a transitive verb; it requires an NP to follow it; since no NP follows it in this sentence, there is said to be a gap. But what of a sentence like *When did you eat?* *Eat* doesn't require a time-adverb to follow it, so is there a gap corresponding to the adjunct *when* or not? If there is not, then adjunct extraction does not really exist at all.

Conclusive evidence is difficult, though not impossible, to find in English; there are, however, a number of languages with richer morphology that overtly mark a verb phrase when something has been extracted from it, so that a diagnosis is relatively simple. Hukari and Levine (1995) find that in such languages, in sentences like *When did you eat?*, the VPs are marked morphologically in just the same way as they are in sentences like *Who do you like?* Extensive cross-linguistic evidence to this effect is arrayed in their article, from such diverse sources as to make it almost incontestable that adjunct extraction is real, and maybe even universal. Moreover, even in the morphologically uninformative English, they adduce evidence, based on strong and weak crossover effects, that adjuncts are extracted in the same way as complements.

### 5.3 What about traces?

#### 5.3.1 No traces assumed

Given that adjunct extraction exists, the next question is how it works. One of the first decisions that needs to be made is whether extraction operates with or without traces. I will be assuming a traceless theory for two reasons. First, there are the telling examples in Pollard and Sag (1994) (p. 377), taken from Pickering and Barry (1991):

- (20) Which box did you put the very large and beautifully decorated wedding cake bought from the expensive bakery in \_\_?
- (21) In which box did you put the very large and beautifully decorated wedding cake bought from the expensive bakery \_\_?

Assuming that traces are real, both sentences would have a trace at the end, separated from the filler by a long, rambling NP; thus, each sentence should be equally difficult to process. The second sentence, however, is much easier to process. Pickering and Barry's explanation is that a filler is not held in a listener's memory until its trace is encountered, but only until whatever element calls for the filler (in this case, the verb *put*) is processed. This argument joins forces with another convincing point in Fodor & Sag (1994). They challenge one of the traditional pieces of evidence taken to prove the existence of traces, specifically, the idea that a trace blocks contractions, as in:

- (22) Who do you want \_\_ to sing the national anthem?  
\*Who do you wanna sing the national anthem?

If this claim were really true, they say, it would be impossible to get sentences like this:

- (23) Who do you think's gonna win?

The above evidence does not rule out the existence of traces, but it does call into question the evidence that has been used to promote them. Therefore, it will be taken as the null hypothesis here that traces do not exist. The formal machinery of extraction, especially adjunct extraction, becomes more difficult with no traces allowed. Nevertheless, traces will play no part in the explanation of adjunct extraction to follow.

#### 5.3.2 Consequences of not having traces

Levine (1997) presents some significant problems for a traceless adjunct-extraction theory. He observes that traceless extraction of complements is relatively easy to accomplish, since a traceless extraction rule is allowed to take any element on a lexical head's COMPS list and put it into the SLASH set. Thus, a filler can be processed as soon

as the lexical head that subcategorizes for it, and therefore has an appropriate value in its SLASH set, is encountered. The very definition of adjuncts, however, is that they are not subcategorized for: they do not appear on the COMPS list. Consequently, they cannot be removed from the COMPS list, and the SLASH set can keep no record of them when they are extracted. Traceless extraction of adjuncts is therefore impossible unless some way can be found to put them into a verb's SLASH set.

There are two ways of accomplishing this aim. One is to have a lexical rule put extracted adjuncts directly into a verb's SLASH set. However, this approach (known as an adjunct extraction lexical rule, or AELR) runs aground when there is more than one adjunct. Levine gives the following example:

- (24) a. Robin washed the car frequently rather rarely.  
 b. Rather rarely, Robin washed the car frequently.

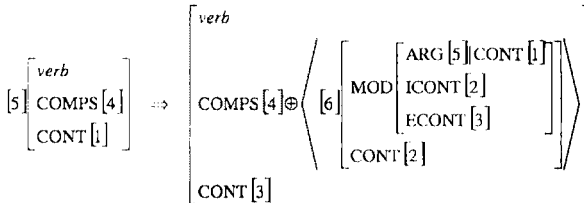
Sentences a and b above should have the same meaning, with *rather rarely* taking wide scope with respect to *frequently*, but the way that an AELR must be stated forces *rather rarely* to have narrow scope. The other way of getting extracted adjuncts into the SLASH set is to have a lexical rule put extractable adjuncts on the COMPS list, from which those that are actually extracted will be recorded in SLASH in the same way as extracted complements are. In other words, this approach is to allow adjuncts to be treated as complements. Such an approach is ultimately what will be pursued here, but it raises a host of problems that will need to be dealt with. An overview of the adjuncts-as-complements approach and associated problems is presented immediately below, in section 5.4.

## 5.4 Treating adjuncts as complements

### 5.4.1 The basic approach

The idea of treating adjuncts as complements starts out simply enough: an adjunct is placed on a verb's COMPS list. The first complication that arises is due to the Semantics Principle, which states that the semantic head in a head-complement structure is the same as the syntactic head, while the semantic head in a head-adjunct structure is the adjunct. So if adjuncts are treated as complements, then the CONTENT of the verb that takes them must somehow "pre-incorporate" the meaning of the added adjuncts if it is to remain the semantic head of the phrase. This is often done by a lexical rule like (25), modeled on van Noord and Bouma (1994) and adapted to fit Kasper's approach to modification. As can be seen, the CONTENT of the original verb is not same as the CONTENT of the verb with the added adjunct. Once such a lexical rule has been posited, adjunct extraction is possible, but not without certain shortcomings, as will be discussed below.

## (25) Adjunct Addition Lexical Rule



## 5.4.2 Problems

There are several objections that have been raised with respect to treating adjuncts as complements. Three of them, which are concisely presented in Kasper and Calcagno (1997), can be called the Quantifier Scope issue, the Linear Order issue, and the Depth-of-Derivation issue. Levine (1997) also discusses the Linear Order issue, and brings up a fourth problem related to facts about cataphora.

## 5.4.2.1 Quantifier scope

As discussed in Kasper and Calcagno (1997), treating adjuncts as complements can cause problems when quantifiers enter the picture. Consider sentence (26):

- (26) (from Kasper and Calcagno (1997))  
Kim apparently almost saw two unicorns.

It is possible to retrieve the quantifier, *two unicorns*, so that its scope is "intermediate between [the] adjuncts" (here, *apparently* and *almost*); that is, one reading of (26) could be paraphrased, "It is *apparently* the case that there were *two unicorns* and that Kim *almost* saw them." However, the usual methods of adding adjuncts to a verb's COMPS list involve "pre-incorporating" the meaning of the adjuncts into the meaning of the verb, so that by the time the verb combines with its quantified complement, that complement is forced to take wider scope than the adjuncts, making scopings like the one mentioned above impossible.

## 5.4.2.2 Linear order

Kasper and Calcagno (1997) also point out that if adjuncts and complements are indistinguishable, there is no means of explaining why an adverb can sometimes appear preverbally, and sometimes not. Consider the sentences in (27):

- (27) (from Kasper and Calcagno (1997))  
a. Sandy harshly criticized her students.

- b. \*Sandy harshly treated her students.

When adjuncts and complements were distinct, a ready explanation was that adjuncts could appear preverbally, while complements could not. Thus, since *treat* subcategorizes for an adverbial complement, the adverb *harshly* in (27b) is a complement, and cannot be placed before the verb. That explanation is no longer available.

### 5.4.2.3 Depth of derivation

A third issue that Kasper and Calcagno (1997) raise is that a lexical rule adding adjuncts to a verb's COMPS list would have to apply as many times to the verb as there are adjuncts in a particular VP. For example, in the VP *love him passionately forever*, the verb *love* would have undergone an adjunct-addition rule twice (once for each adverbial), but still have the same phonology as the ordinary *love* that has not had this rule applied. As a consequence, Kasper and Calcagno say, "The correspondence between signs and overt forms is thus much less direct...."

Not only is such a situation inelegant, it also adds a significant burden of nondeterminism in processing sentences. The reason is that when adjuncts are treated in the traditional way, as selecting a single VP as an argument, there are fewer constituents that are eligible to be that argument, and thus, less checking that needs to happen. In contrast, when it is the VP that selects any number of adjuncts, which could be simple adverbs, or PPs, or even subordinate clauses, many more of the constituents in a sentence will need to be checked.

### 5.4.2.4 Cataphora

The basic problem with cataphora, or "backwards anaphora," can be summed up in two sentences, and Levine (1997) does so:

NPs in complement clauses may not corefer with either matrix subjects or matrix objects.

NPs in adjunct clauses may corefer with [matrix] objects but not [matrix] subjects. (p. 10)

In other words, when entire clauses are being considered, there is a distinct difference between complements and adjuncts. To illustrate, consider the sentences in (28):

- (28) a. \*They<sub>i</sub> discovered that Robin just can't stand [the twins]<sub>i</sub>. (Levine (1997), (26c))  
 b. \*I told them<sub>i</sub> that Robin just can't stand [the twins]<sub>i</sub>.

These sentences illustrate the first half of Levine's claim, with the NP in the complement



(29) a. \*They<sub>i</sub> never do anything without [the twins]<sub>i</sub> feeling insecure about it.  
(Levine (1997), (26b))  
b. You can't say anything to them<sub>i</sub> without [the twins]<sub>i</sub> getting offended.  
(Levine (1997), (24))

## 5.5 Attempts to solve the problems

Unfortunately, although Przepiorkowski adequately deals with quantifier scope, he fails to address the other issues. Worse, his solution to quantifier scoping does not generalize to other kinds of scoping that will also need to be dealt with, including adjunct/negation scoping, and adjunct/adjunct scoping. Consider the examples in (30):

- (30) a. (Complaint about a television station, heard at halftime during a televised football game)  
They're not going to show the band again!

- b. Kim almost died because of Robin's incompetence.

The first sentence, in its intended reading, has *again* taking wide scope over *not*; i.e., the TV station had a habit of not showing the halftime band performance, and was about to do so again. However, there is an easily imaginable context that would favor *not* taking scope over *again*: one in which the band has been shown at least once already, and will not be shown again. The second sentence has a similar scope ambiguity between *almost* and *because of Robin's incompetence*. Back when adjuncts were distinct from complements, such ambiguities could correspond to two different syntactic structures, as shown in (31):

- (31) a. They're [VP [VP not going to show the band] again] !  
           They're [VP not [VP going to show the band again]] !  
       b. Kim [VP [VP almost died] because of Robin's incompetence].  
           Kim [VP almost [VP died because of Robin's incompetence]].

If all adjuncts are complements, however, then the VPs will have a flat structure, and it will be difficult to get both possible scopes. One way would be to attribute the distinct scopings to the order in which each adjunct/complement contributes its meaning to the VP; another would be to expand the theory to include something like MODIFIER-STORE, or NEG-STORE. Both would significantly increase complications. For these reasons then -- the unresolved problems of linear order and depth-of-derivation, plus the limited utility of his approach to scoping -- I do not favor Przepiorkowski's framework for treating adjuncts as complements.

### 5.5.2 Bouma, Malouf and Sag (1997)

Przepiorkowski's basic problem arises from calling *all* adjuncts complements. Bouma, Malouf and Sag (1997) lay out a finer-grained (though still problematic) method of distinguishing between complements and adjuncts, and manage to circumnavigate the linear-order issue. Their method is based on carefully defining a word's *argument-structure*, its *valence*, and its *dependents*. They define the argument structure, represented by the feature ARG-ST, as a list of arguments that must be supplied for the word; in the case of verbs, these would be its subject and what I am calling its "true" complements. A verb's valence (VAL) comprises its subject (SUBJ) and its complements (COMPS). An important point is that ARG-ST is *not* the append of SUBJ and COMPS, as is often assumed. In fact, no relation holds between ARG-ST and SUBJ and COMPS. Instead, the DEP(ENDENT)S feature is used to express what the verb's valence will be. A verb's dependents are its arguments plus any adverbs that appear in its VP. A constraint on words identifies the first element in a verb's DEPS list as its SUBJ, and relates the rest of the DEPS list to the COMPS list. The details of this relationship will be given later; for now, the important part is that Bouma *et al.* have established a way to tell a verb's original complements from adjunct-complements: the former are those that appear on ARG-ST, while adjunct-complements are those that appear only on DEPS.

Both kinds will appear on COMPS, allowing the desired treatment of adjuncts as complements.

With these relations in place, Bouma *et al.* draw their distinction between adjuncts and complements in English: adjuncts appear preverbally; complements postverbally (when not extracted). To be sure, this is not a definition; in giving such a rule, Bouma *et al.* finesse the issue of what truly makes an adjunct an adjunct crosslinguistically. However, with this rule, the deviance of *\*Sandy harshly treated her students* is once again explicable: *harshly* in preverbal position cannot be the complement that *treated* demands; it has to be an adjunct. Furthermore, there does seem to be some independent justification for a preverbal/postverbal adverbial distinction, though the full picture is not complete. For example, McConnell-Ginet (1982) presents evidence suggesting that the preverbal position is a special position where an adverb can contribute a different meaning to a VP than it could postverbally. Consider the contrast in (32), taken from McConnell-Ginet (1982):

- (32) a. Louisa rudely departed.  
b. Louisa departed rudely.

For certain adverbs, including *rudely*, a preverbal position imparts more of an "editorial comment" reading than an actual "manner of action" reading; i.e., (32a) could be paraphrased *It was rude of Louisa to leave*, while (32b) could not. Also, it is a fact that certain adverbs, such as *probably*, can appear only preverbally, and such adverbs cannot be extracted -- evidence consistent with the hypothesis that they are not on the verb's DEPS list:

- (33) a. \*Louisa departed probably.  
b. \*Probably, I think Louisa departed.

Even if these justifications are granted, however, Bouma *et al.*'s distinction of adjuncts and complements is not satisfactory. First of all, although Bouma *et al.* don't say so, in order to implement their distinction between adjuncts and complements, there would need to be a new feature, which I will call ADJT. ADJT would be a Boolean feature; pure adjuncts like *probably* would be lexically specified as ADJT:+. Such a feature would allow constraints to be stated that would prevent words like *probably* from being added to the DEPS list; specifically, a constraint stating that all elements in the DEPS list are ADJT:-. Adverbs that could appear pre- or postverbally, like *carefully*, would be unspecified for ADJT, with the value becoming specified as + or - depending on whether it actually appeared before or after the verb. It might be tempting to try to avoid this new feature, relying instead on the previously outlined revision of the MOD feature, perhaps by defining adjuncts as signs that are MOD|ARG:synsem, and complements as MOD|ARG:none. Such a proposal, however, would work only if there were no adverbial complements. But since there are plenty of adverbial complements (under the new definition of complement), which are all MOD|ARG:synsem, this

distinction is insufficient. Worse still, nothing would prevent a BNPA, which would be MOD|ARG:synsem, from appearing preverbally, if being MOD|ARG:synsem were the same thing as being ADJT:+. Thus, a sentence like *\*We every place in town stayed* would be licensed, in the same way as *We cautiously stayed*. There would still need to be an ADJT feature to distinguish between constituents that use their MOD in the traditional way (i.e., true preverbal adjuncts), and those that use it in some sort of adjuncts-as-complements lexical rule (i.e., adverbial complements, including BNPA's).

Beyond having to posit an ad hoc feature, there is a deeper problem with distinguishing English adjuncts from complements based on linear order. To do so in good faith, the linguist must believe that the linear ordering facts really do reflect whatever the true distinction between adjuncts and complements is, and that a feature concerning a sign's linear order can eventually be replaced with a more appropriate feature as more knowledge is gained. If a semantic distinction is what will replace ADJT, then there is the obstacle of explaining why so many adverbs (unlike *rudely* in the previous examples) seem to make the same meaning contribution whether they appear pre- or postverbally. A last-ditch effort to save the linear ordering distinction might be to say that adverbial adjuncts have the *potential* to modify a VP in a manner different from adverbial complements, and that whether the potential is realized is an issue of context or world knowledge. But even this attempt crashes when examples like those in (34) are considered:

- (34) a. Kim regularly washes the car.  
       b. \*Kim with regularity washes the car.  
       c. Kim washes the car with regularity.

*Regularly* is an adjunct by the linear-order definition; *with regularity* is presumably also an adjunct, since it means the same thing. But *with regularity* can only appear after the verb, like all PPs. And of course, the examples involving cataphora pose similar problems. Consequently, we are almost back to where we started, with both complements and adjuncts appearing after the verb, and no certain way of telling them apart.

What can be salvaged of Bouma *et al.*'s approach to adjuncts vs. complements? Preverbal adverbs can certainly be called adjuncts, in keeping with tradition, and avoid Kasper and Calcagno's linear order objection. As for postverbal constituents, the verdict is not in, and it will not be decided here. All that is necessary in order to proceed with an analysis of BNPA relative clauses, is whether BNPA's specifically are adjuncts or complements. It is known that they cannot appear in the preverbal adjunct position, as demonstrated in (35):

- (35) a. \*We there stayed.  
       b. \*We Saturday had a party.

This does not necessarily mean that BNPA's are complements, however. The rule is that if a word can appear preverbally, it is an adjunct. The converse -- if a word is an adjunct, it can appear preverbally -- is not known to be true, and therefore, neither is the converse's contrapositive (if a word cannot appear preverbally, it is not an adjunct). So BNPA's could simply be adjuncts that, for whatever reason, are not allowed to appear in the preverbal slot. Nonetheless, I take the null hypothesis to be that any one-word adjunct can appear in the preverbal position, and thus (35) supports the classification of BNPA's as complements, especially given the data from Hukari and Levine in 5.2. The general template for a BNPA word, then, should be modified to include an ADJT:- specification, though I will reiterate my stance that this feature should eventually be replaced.

We have Bouma *et al.*'s attempt at solving the linear order issue. For the issues of scope (quantificational and otherwise) and depth of derivation, Bouma *et al.* have a single solution: Minimal Recursion Semantics. The basic idea is that the CONTENT of any sign contains an attribute whose value is a list of all relevant scoping relations for the phrase being described. Some of these conditions will be specified lexically, some semantically, and some will only enter the picture when and if sufficient contextual information necessitates them. Thus, all scope interactions, whether they involve quantifiers, negation, adjuncts, adjunct-complements, or any combination, are addressed in one place, and furthermore, underspecified scopes are easily represented.

As for depth-of-derivation, instead of having a lexical rule that can apply any number of times, changing a verb's CONTENT every time, Bouma *et al.* let the DEPS list hold any number of adjunct-complements, each of which is decreed to modify the verb, as seen in (36):

(36) Constraint on adverbs (modified from Bouma *et al.* (1997), (40))

$$verb \Rightarrow \left[ \begin{array}{l} \text{HEAD} [3] \\ \text{ARG-ST} [1] \\ \text{DEPS} [1] \oplus list \left( \left( \begin{array}{l} \text{ADJT} + \\ \text{MOD} \left[ \begin{array}{l} \text{HEAD} [3] \\ \text{CONT} [2] \end{array} \right] \end{array} \right) \right) \\ \text{CONT} [2] \end{array} \right]$$

The seeming problem is that such a statement would rule out iterative modification. That is, in a VP like *wash the car frequently rather rarely*, *rather rarely* would not modify *wash the car frequently*, but just *wash the car*, as would *frequently*. However, reducing recursion is the name of the game in MRS. To get the scopings right in examples like those above, devices known as handles are used in conjunction with the list of scope conditions.

Of the two approaches to traceless adjunct extraction reviewed here, MRS is the more promising. There are, however, still some bugs to be worked out of the MRS system, and therefore, I will not be using its semantics here. But MRS semantics is the primary reason that Bouma *et al.*'s constraint on adverbs can be stated so as to avoid the depth-of-derivation problem; to use more traditional HPSG semantic features like CONT in the above constraint would convert it to a lexical rule that could apply any number of times. Therefore, I will not be using Bouma *et al.*'s constraint on adverbs in my explanation of adjunct extraction. Though I will make use of their ARG-ST/DEPS/VAL relationships, I will have to resort to a lexical rule similar to that proposed in Przepiorkowski (1997). It is my hope that the MRS system can be improved such that the constraint on adverbs in (36) will be usable instead of the lexical rule I will employ.

### 5.6 How to extract adjuncts

At this point, I can present the details of my synthesized version of adjunct extraction, as was promised above, but first it should be noted that by Bouma *et al.*'s description of adjuncts and complements, what we have been calling adjunct extraction up until now is really complement extraction. True verbal adjuncts cannot be extracted at all, since they do not appear on a verb's DEPS list. Of course, adjectives and other phrases that modify nouns are also true adjuncts, and cannot be extracted. This prediction is borne out in examples like those below:

- (37) a. \*Probably, I think Louisa departed.  
b. \*Red, I kicked the ball.

I will continue, however, to maintain a distinction between traditional complements and those complements that have previously been known as adjuncts. The latter elements I will call adjunct-complements, continuing the convention begun in the previous section.

I will present my explanation of adjunct-complement extraction by discussing two sample VPs: *saw a unicorn today* (adjunct-complement *in situ*), and *Today, Robin saw a unicorn* (extracted adjunct-complement). First, however, the relevant rules and constraints will be presented, starting with BM&S's rule of Dependent Realization:

- (38) Dependent Realization (DR) (Bouma *et al.*, (1997), (68))

$$\text{word} \Rightarrow \left[ \begin{array}{l} \text{SUBJ [1]} \\ \text{COMPS [2]}_{list(\text{canon-ss})} \\ \text{DEPS [1]} \oplus ([2] \text{O}_{list(\text{gap-ss})}) \end{array} \right]$$

The first element of the DEPS list is token-identical with the SUBJ value. The rest of the DEPS list consists of elements on the COMPS list, represented by [2], shuffled with a list

of gap-synsems. The COMPS list, however, contains only canonical-synsems, that is, synsems that are not gap-synsems -- or in other words, non-extracted elements. The DEPS list, not COMPS, keeps track of extracted constituents.

At this point, we can introduce the Adjunct-Complement Addition Lexical Rule, which is modeled on those of van Noord and Bouma and Przepiorkowski, but incorporates Bouma *et al.*'s ideas about DEPS and ARG-ST, plus the features ARG, ICONT, and ECONT from Kasper (1998):

(39) Adjunct-Complement Addition Lexical Rule (ACALR)

$$\begin{array}{c} \left[ \begin{array}{c} \text{verb} \\ \text{SS} [1] \left[ \begin{array}{c} \text{VAL} \left[ \begin{array}{c} \text{SUBJ} [3] \\ \text{COMPS} [10] \end{array} \right] \\ \text{ARG-ST} [2] \\ \text{DEPS} [3] \oplus [4] \\ \text{CONT} [5] \end{array} \right] \end{array} \right] \end{array} \Rightarrow \left[ \begin{array}{c} \text{verb} \\ \text{SS} [7] \left[ \begin{array}{c} \text{VAL} \left[ \begin{array}{c} \text{SUBJ} [3] \\ \text{COMPS} [8] \end{array} \right] \\ \text{ARG-ST} [2] \\ \text{DEPS} [3] \oplus [4] \oplus \left\langle [7] \text{MOD} \left[ \begin{array}{c} \text{ARG} [1] \\ \text{ICONT} [9] \\ \text{ECONT} [6] \end{array} \right] \right\rangle \\ \text{CONT} [6] \end{array} \right] \end{array} \right] \end{array}$$

$[4] = [10] \circ \text{list}(\text{gap-ss})$ 
 $[4] \oplus \langle [7] \rangle = [8] \circ \text{list}(\text{gap-ss})$

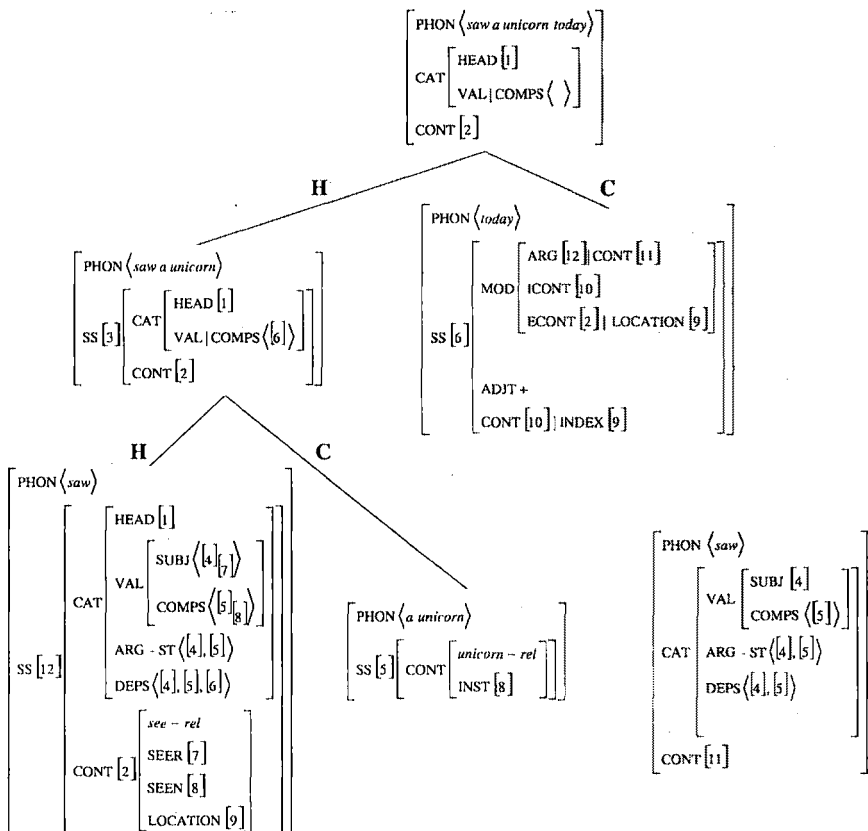
The ACALR takes as input a verb with ARG-ST [2] (with a base verb, this will consist of the append of [3] and [4]). Since there are no adverbs depending on the verb, DEPS is identical with ARG-ST. By DR, the list [2] is parceled out among the valence attributes, with [3] going to SUBJ and the non-gap elements of [4] going to COMPS. The output of the ACALR is a verb with the same phonology as the input verb, but with an adverbial, [7], appended to the DEPS list. By the DR, [7] and [4] both become the COMPS list. The CONT of the output verb is not [5], as with the input verb; rather it is [6], which is taken from the ECONT of the adverbial. Though it is not shown in the above rule, the ECONT is a value that combines the CONT [5] of the original verb with the adverbial's ICONT [9].

### 5.6.2 Example without extraction: *saw a unicorn today*

The ACALR and DR constraint interact as shown in the AVM for *saw a unicorn today*, shown in (40) on the following page. The first thing to notice is how the ACALR takes the original *saw*, shown at the bottom left, and licenses the one seen at the bottom of the tree. The DEPS list, identical with the ARG-ST in the original verb, has had [6] added to it, and since [6] (*today*) has not been extracted, it also appears on the COMPS list. The

CONT of *saw*, [11] in the original, now is [2], which comes from the ECONT value of *today*. Note that this ECONT is almost the same as CONT [11] in the original *saw*, except that the feature TIME is now specified, as [9]. The AVM for *today* is specified as ADJT: -, since this is an adjunct-complement. The rest of the tree falls into place under the usual assumptions of HPSG, plus those of Kasper (1998), explained in section 2.

(40) AVM for *saw a unicorn today*



5.6.2 Example with extraction: *today Robin saw a unicorn*



Before covering an example with extraction, Bouma *et al.*'s principles concerning SLASH values need to be introduced:

- (41) SLASH Inheritance Principle (SLIP) (Bouma *et al.* (1997), (64,65))

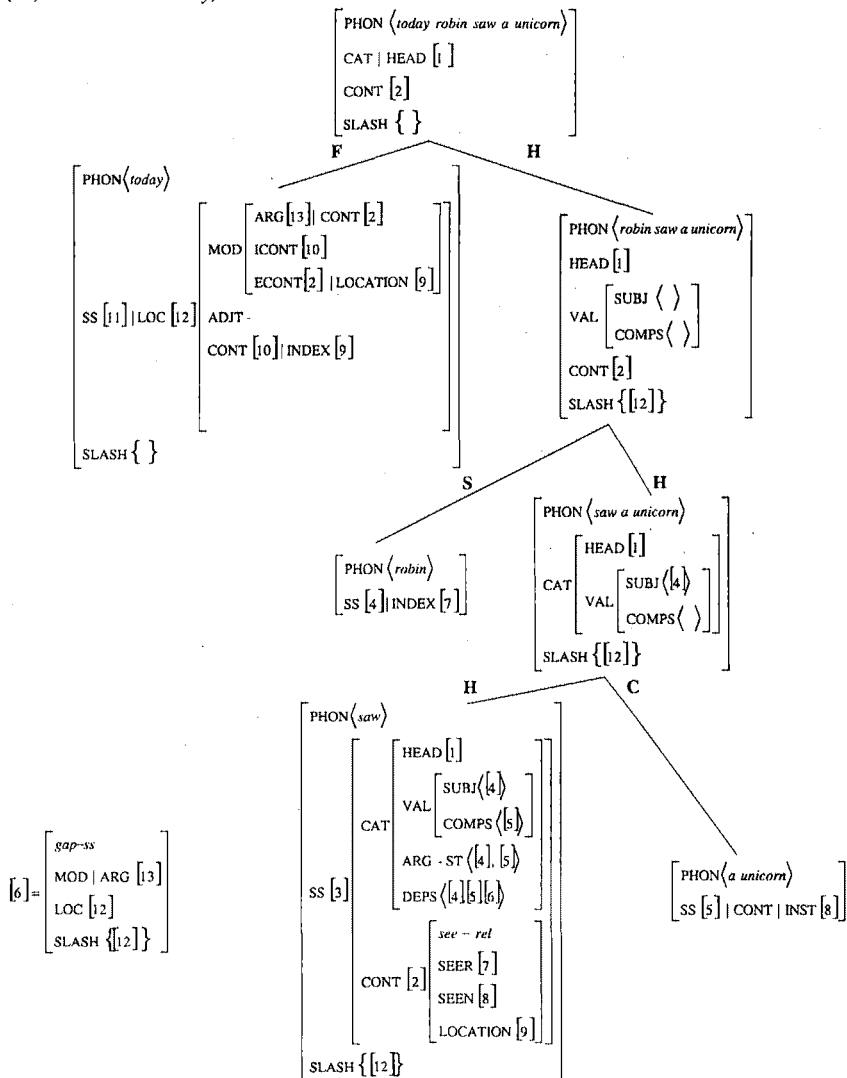
$$hd-val-ph \Rightarrow \begin{bmatrix} \text{NONLOC|SLASH}[i] \\ \text{HD-DTR|NONLOC|SLASH}[i] \end{bmatrix} \quad hd-filler-ph \Rightarrow \begin{bmatrix} \text{NONLOC|SLASH}\{ \} \\ \text{HD-DTR|NONLOC|SLASH}\{[i]\} \\ \text{NON-HD-DTRS}\langle[\text{LOC}[i]]\rangle \end{bmatrix}$$

- (42) SLASH Amalgamation Constraint (SLAC) (Bouma *et al.* (1997), (63))

$$word \Rightarrow \begin{bmatrix} \text{LOC|CAT} \begin{bmatrix} \text{DEPS}\langle[\text{SLASH}[i]], \dots, [\text{SLASH}[n]]\rangle \\ \text{BIND}[0] \end{bmatrix} \\ \text{NONLOC|SLASH}([i] \cup \dots \cup [n]) - [0] \end{bmatrix}$$

The SLAC is what allows traceless propagation of SLASH values. A word's SLASH value collects the SLASH values from each element in the DEPS list. This amalgamated SLASH value percolates upward via the SLIP. These SLASH principles work in conjunction with the ACALR and DR, as exemplified in the AVM for *Today, Robin saw a unicorn*, shown in (43) on the following page.

As before, the ACALR is responsible for the verb *saw* with the adverbial [6] on its DEPS list. (This time, the original verb is not shown, since it can be referred to on the previous diagram; its SS value is [13].) Now [6] is a gap-synsem, as can be seen in its separate AVM at the bottom left of the main tree below: its LOC is token-identical with the singleton value in its SLASH set. Notice that even though [6] corresponds to the adverb *today*, the synsem [6] is *not* the same as the synsem for *today*, which is tagged [11]. If such were the case, then the extracted *today* would have to have a SLASH value of [12], as is specified for [6]; such a situation is clearly undesirable, since by the SLIP, *today* as a filler daughter has to have the empty set for its SLASH value. The LOC value of [12], however, is shared, and thus the appropriate information can be included in the CONT value for *saw*, as required by the ACALR. The SLASH values percolate according to the SLIP; *today* here is still marked as ADJT: -, since it is still an adjunct-complement.

(43) AVM for *Today, Robin saw a unicorn*

## 5.7 Overview of "adjunct" extraction

This concludes the explanation of how adjunct extraction will be handled. Before applying the ideas here specifically to BNPA's, a review would be in order. The main points are that:

- 1) Adjunct extraction is a misnomer, since the items we are extracting are in fact (optional) complements.
- 2) Only adjuncts may occur immediately preverbally; both complements and adjuncts can occur postverbally.
- 3) Adjunct-complements appear on a verb's DEPS subject to the Dependent Realization Constraint; those that are not extracted are also on the COMPS list.

Although I have used a lexical rule adapted from Przepiorkowski (1997), I believe that once the semantics of MRS (or a similar system) is ironed out, this lexical rule can be abandoned, eliminating once and for all both the depth-of-derivation problem and the various kinds of scoping problems.

## 6 How to handle BNPA's

### 6.1 Non-relative clause BNPA's

The explanations offered by Larson and Kasper, taken in conjunction with BM&S's delineation of adjuncts and complements, are sufficient to describe the behavior of non-relative-clause BNPA's. To review, BNPA heads are lexically marked as such; that is, they are unspecified as to whether their MOD|ARG value is *synsem* or *none*, and they are ADJT:-. Thus, they can never appear in a head-adjunct structure (i.e., preverbally, as in *\*we Saturday had a party*), and when they appear in a head-complement structure, they will produce the appropriate meaning depending on whether they are on the verb's ARG-ST list (in which case they must be MOD:*none*), or are added to the DEPS list by the ACALR (in which case they must be MOD|ARG:*synsem*).

### 6.2 BNPA relative clauses

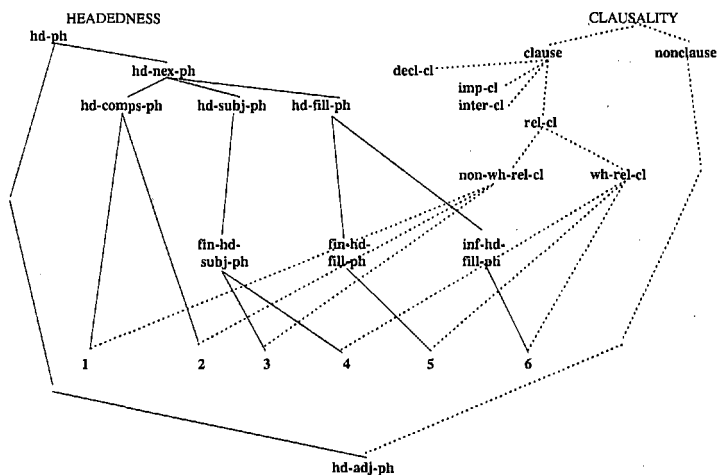
In this section I will be bridging a gap between Sag's treatment of English relative clauses (Sag (1997)) and Kasper's reworking of HPSG-style modification (Kasper (1998)). In his paper, Sag takes on almost every kind of relative clause imaginable, including *wh*-less infinitival relatives. However, he deals only with those involving subjects of the infinitive ("A person to fix the sink") or complements of it ("a book to read"), and bypasses those that involve adjunct-complements, including BNPA infinitival relatives. Kasper, on the other hand, strikes at the heart of the issue in his treatment of BNPA's, but since the focus of his paper is on modification in general, he stops short of

showing how specifically to treat BNPA's in infinitival relative constructions.

### 6.2.1 Sag (1997) on English relative clauses

Sag makes use of a multiple-inheritance hierarchy to classify the different kinds of relative clauses. His starting point is the sort *phrase*, a class which can be partitioned according to HEADEDNESS or CLAUSALITY. At the bottom of the hierarchy, any given species of relative clause will inherit some of its characteristics from the HEADEDNESS hierarchy, and some from the CLAUSALITY hierarchy. This hierarchy is summed up in (44). Each of these sorts in this hierarchy has an associated set of constraints, which is inherited by its subsorts. The individual species occurring at the bottom of this multiple-hierarchy (that is, the ones labeled by number, as well as *hd-adj-ph*) must satisfy all the constraints inherited from the HEADEDNESS side and all the constraints inherited from the CLAUSALITY side. For example, *simple-inf-rel-cl* must satisfy the constraints for: *hd-ph*, *hd-nex-ph*, *hd-comps-ph*, *clause*, *rel-cl*, *non-wh-rel-cl*.

#### (44) Sag's Multiple Inheritance for Relative Clauses



- 1 = *red-rel-cl* (Reduced relatives)
- 2 = *simple-inf-rel-cl* (Infinitival relatives)
- 3 = *bare-rel-cl* (Relative clauses without a relative pronoun, except for infinitival relatives)
- 4 = *wh-subj-rel-cl* (wh-relatives, with wh-phrase as subject)
- 5 = *fin-wh-fill-rel-cl* (wh-relatives, with wh-phrase as a filler)
- 6 = *inf-wh-fill-rel-cl* (Infinitival relatives with pied-piped preposition)

There are three primary criticisms with a multiple hierarchy such as Sag's. The least serious of them is that computationally, a hierarchy doesn't have any effect. Even though, for instance, the constraints for the general *hd-ph* are only coded once, at compile time they will be copied and recopied for every subtype of *hd-ph*. At best, a hierarchy is only good for the grammar writers, providing convenient abbreviations and shortcuts. The second criticism is the fact that some of the types are based on hazy (though undeniably real) semantic criteria; for example, *inter-cl*, *imp-cl* and *decl-cl*. Sag himself concedes this, "assuming that semantic theory will distinguish among kinds of messages, as indicated." (Sag (1997), p. 14) Third, and most serious, is that in factoring out all the various commonalities among the different types of clauses, some characteristics may not make for natural classes. To use an analogy from biology, grouping together all animals that have eyes with lenses would put most vertebrates plus the squid into one group, but it wouldn't be a group that reflected any kind of natural classification. Therefore, there had better be some strong motivation for using a particular characteristic as a basis for separating out another subtype of clauses.

Despite these criticisms, I will be using and adding to Sag's classification of relative clauses because whether or not the hierarchy he has established proves to be well-founded, the constraints he has posited for the various types of relative clauses do at least seem to capture the majority of facts accurately, and it is the most thorough attempt at a formal description of relative clauses that I am aware of.

### 6.2.2 Additions and amendments

We now have all the equipment we need in order to handle BNPA relatives: 1) the constraints proposed by Sag; 2) Kasper's constraints for intersective adjectival modifiers and head-adjunct phrases in general; and 3) a method for extracting the adjunct-complements in adverbial relative clauses. I have made a number of additions and changes to Sag (1997) in order to incorporate some of the ideas from Kasper (1998) and to allow the content of adverbial relative clauses to come out right.

One change that I have made to the hierarchy (as suggested by Bob Kasper) is in the sort *hd-adj-ph*. In his paper, Sag divides head-adjunct phrases into two types: *simple-hd-adj-ph* for most head-adjunct phrases, and *hd-rel-ph* for the head-adjunct phrases that are relative clauses. This division becomes unnecessary when Kasper's treatment of modification is incorporated. Relative clauses can be specified in much the same way as Kasper's sort *intersective-adjective*, and can then be treated effectively with all other modifiers in head-adjunct phrases, as shown in (45) on the following page.

Second, I have changed two of the definitions of the infinitival relatives (*simple-inf-rel-cl* and *inf-wh-fill-rel-cl*, items 2 and 6 in the inheritance diagram): whereas Sag lists them as of type *proposition*, I am listing them as *hypothetical*, which is, along with *proposition*, a subtype of a sort that Sag (p.c) calls *propositional*. The name *hypothetical*

is self-explanatory, and I am using it for infinitival relatives because I want to make it explicit that, for example, *a place to stay* is not necessarily a place where someone has stayed or will stay, but is rather just a place that someone can, should or may stay.

- (45) Constraints for relative clauses (modeled on Kasper (1998) *intersective-adj*)

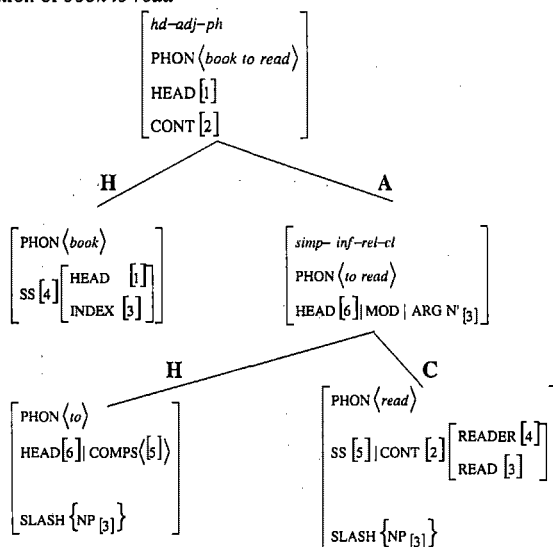
$$rel-cl \Rightarrow \left[ \begin{array}{c} \text{HEAD|MOD} \left[ \begin{array}{c} \text{ARG|CONT} \left[ \begin{array}{c} \text{INDEX [1]} \\ \text{RESTR [2]} \end{array} \right] \\ \text{ICONT [3]} \\ \text{ECONT} \left[ \begin{array}{c} \text{INDEX [1]} \\ \text{RESTR [2] \& [3]} \end{array} \right] \end{array} \right] \\ \text{CONT [3]} \end{array} \right]$$

Another change I have made deserves special attention, and it concerns how SLASH values propagate. Extraction from relative clauses is different from other extractions in one important respect: the LOCAL value of the modified sign cannot be structure-shared with that of the gap. The reason is that the gap will be looking for an NP (a specifier-saturated phrase), while the modified sign will actually be an N' (specifier-unsaturated). To illustrate, the gap in *to read* \_\_\_ is looking for an NP, such as *a book*. However, the filler in *book to read* is just *book*, an N'. To be sure, there has been debate about whether relative clauses modify NPs or N's. I am assuming that they modify N's so that I won't have to take on the problem of excluding phrases like *\*San Francisco to stay in*, or *\*Moby Dick to read*. To capture this behavior, Sag simply declares that the SLASH value of non-wh relative clauses is an empty set -- in other words, he just binds off the SLASH by fiat, before it ever encounters the modified N'. (In wh-relative clauses, too, the SLASH is bound off before encountering the modified N', but Sag doesn't have to take any special measures to achieve this result, since it falls out from constraints on head-filler phrases.) The N' finds its way into the structure because Sag declares that the relative clause's MOD|ARG value is an N' that is coindexed with the SLASHed NP in the relative clause's head daughter, as seen in the derivation for *book to read* in (46).

This solution works acceptably for the complement-extraction cases Sag considers; for example, the verb *read* in (46) already has a role in its CONT waiting to be filled with an index for the object that is read. For our purposes, though, since an extra role is being specified in the verb's content, coindexing is not enough. Suppose the above phrase were *a place to read* instead of *a book to read*. To get the semantics of *place* as a BNPA correct, the *non-wh-rel-cl* (in this case, a *simple-inf-rel-cl*) needs access to the ECONT of *place*, which specifies how it must modify the CONT of *read*. ECONT, in turn, relies on ICONT, and ICONT gets its value from the CONT of *place*. Thus, the element in the SLASH set must share not just the INDEX, but rather the entire CONT with the MOD|ARG value of the *non-wh-rel-cl*, as well as the SLASHed element's

HEAD, in order to allow access to the ECONT and ICONT values. Only in this way will content of the

(46) Derivation of *book to read*



BNPA make the contribution that it needs to. I have made such a modification in the constraints for the type *non-wh-rel-cl*. An AVM for a general infinitival relative clause is shown in (47), incorporating Sag's constraints for *simple-inf-rel-cl* (that is, the set of constraints for *hd-ph*, *hd-nex-ph*, *hd-comps-ph*, *clause*, *rel-cl*, *non-wh-rel-cl* and *simple-inf-rel-cl*), Kasper's MOD structure, and my own changes as mentioned above.

Also, even though *reason* has been excluded from the class of BNPA words, in the interest of completeness I have also created a subtype of *simple-inf-rel-cl* to handle infinitival relative clauses of *reason*. Unlike the other non-wh-relatives, the verb in an adverbial relative modifying *reason* has an empty SLASH set. Therefore, instead of the coindexing specified above for *simple-inf-rel-cl*, the SLASH set of the verb will have to be explicitly specified as being empty. Since in all other respects, the constraints for *simple-inf-rel-cl* are accurate for *reason* clauses, the most sensible thing to do is to make the SLASH specifications for *simple-inf-rel-cl* a default, which will be overridden in this subtype, which I have named *gapless-inf-rel-cl*. Specifications for *gapless-inf-rel-cl* can be found in the appendix.

- (47) General form of a simple infinitival relative clause  
(Based on Sag (1997), Kasper (1998); author's additions are in boldface.)

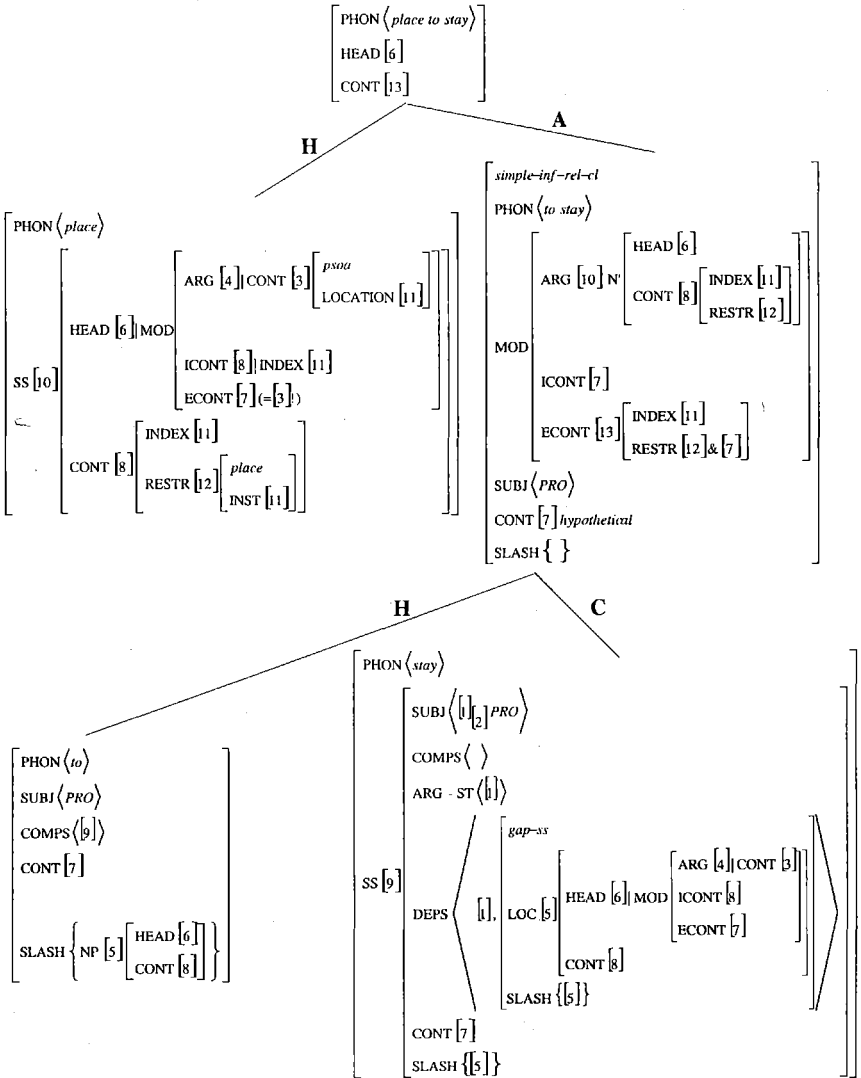
<i>simple-inf-rel-cl</i>	
	<i>comp</i>
	VFORM <i>inf</i>
HEAD [1]	MC -
	INV -
	MOD   ARG N' [HEAD [3], CONT [4]]
SUBJ [2] <b>PRO</b>	
COMPS { }	
REL { }	
QUE { }	
CONT [5] <i>hypothetical</i>	
	HEAD [1]
	SUBJ [2]
	COMPS { [6], ..., [n] }
HD - DTR	CONT [5]
	SLASH / { NP [HEAD [3], CONT [4]] }
	REL { }
	QUE { }
NON-HD-DTRS { [SYNSEM [6]], ..., [SYNSEM [n]] }	

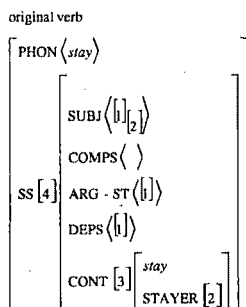
### 6.2.3 Putting it all together

At this point, my proposed treatment of BNPA's has been presented in its entirety. What remains is to see how it all works. Therefore, (48) on the following page shows the derivation of an N' containing an infinitival adverbial relative: *place to stay*.

The lexical entry for the original verb *stay* is shown at the bottom of the tree. ARG-ST and DEPS are identical, with the single element in DEPS being mapped to SUBJ.



(48) Derivation for *place to stay*



The version of *stay* that appears in the tree has been derived via the ACALR. Notice that DEPS now has two elements, the second of which is a gap-synsem. The CONT, tagged as [7], is token-identical to the ECONT of this gap-synsem. Another stipulation of the ACALR is that the ICONT of the gap-synsem is the same as its CONT. By the DR constraint, COMPS is still an empty list, since gap-synsems are not added to COMPS. The definition of gap-synsem decrees that its LOC, tagged [5], be in its SLASH set, which indeed it is, and the SLAC ensures that [5] also appears in the SLASH set for *stay*. Finally, the SUBJ value is *PRO* because the lexical entry for *to* states that its SUBJ is the same as that of its complement. The reason that *PRO* is the SUBJ of *to* will be discussed shortly.

The lexical entry for *to* takes its CONT from that of its complement; thus the CONT here is [7]. The constraints for *simple-inf-rel-cl* state that the SUBJ value for the head-daughter, which is *to*, are the same as the SUBJ for the relative clause itself, which is *PRO*. These constraints also demand that the head-daughter's SLASH set contain a single NP. By the SLAC, this NP will be the same as the one in the SLASH set for *stay*: [5]. The HEAD and CONT values within [5] are written out ([6] and [8] respectively) for easier reference in the derivation.

The infinitival relative *to stay* has CONT [7], inherited from *to* by the Semantics Principle. By Kasper's template for relative clauses, [7] will also be the value for ICONT here. The template decrees that this value become part of the ECONT|RESTR, along with the RESTR from the ARG|CONT value. This ECONT will be identical to the CONT of the entire phrase *place to stay*, by the Semantics Principle for head-adjunct structures. At this point, before moving on to the AVM for *place*, let us step back and see what we want the value of this ECONT, tagged as [13], to be. The entire phrase is an N', so we want [13] to be a *nom-obj*. As for its conjunctive RESTR, we want one conjunct, [12], to identify the INDEX, [11], as a place, and we want the other conjunct, [7], to be the relation that says who is doing the staying, and identifies [13] as the location where

this staying takes place. Now we can look at *place* and see how this happens.

The SYNSEM value for *place*, [10], is the same as the MOD|ARG value for *to stay*, by the definition of a head-adjunct structure. Therefore, the tags for all the values within it can be copied from those of the MOD|ARG part of *to stay*: HEAD [6], CONT [8], INDEX [11], RESTR [12]. At this point, we have half of the RESTR we want in [13]: We have [12] identifying [11] as a place, since [11] fills the INST value for the *place* relation. Now, more information about HEAD [6] is written out in the AVM for *stay*, so it can be copied over as well: ARG [4], CONT [3], ICONT [8], ECONT [7]. At this point, we have almost what we want to complete the ECONT [13] in *to stay*. Up until now, we haven't said what the actual value of [7] is; we have said only that it is the CONT of the post-ACALR version of *stay*. Meanwhile, in the MOD|ARG|CONT slot for *place*, we have [3], which we know is a *stay* relation with *PRO* for a subject, and it is now additionally specified for LOCATION, with the very INDEX, [11], that we have also identified as a place. The only remaining goal is to identify [7] with [3], since we would have met our goal for the second conjunct in the RESTR for [13]. This is where the lexical entry for *place* comes in and finishes the job, declaring the word's MOD|ECONT, [7], to be token-identical to its ARG|CONT, [3]. This completes the derivation of *place to stay*.

## 7 Closing thoughts

There is still much to be discussed concerning Bare-NP Adverbials, some of which has been mentioned in previous sections. The issue of what determiners are legal in BNPA's has been greatly clarified, and separated from that of determiners in PP adverbials, but there is a hint that further discoveries are possible. The problem of preposition stranding has been brought closer to a satisfactory explanation here, but not all the way. The means I have used to extract BNPA's in relative clauses -- redrawing the line between complements and adjuncts -- is still quite controversial, and the version used here is admittedly inadequate to handle several kinds of scoping phenomena. However, I reiterate my belief that the adjuncts-as-complements approach is basically correct, and that a system such as MRS shows promise of solving these problems.

Finally, I must report some data that seem to contradict an assumption about BNPA words that has gone unquestioned so far: that they are a distinct set of lexically marked words. Consider the phrases in (49), seen and heard by the author during the course of writing this paper:

- (49) Troublesome data
- a. The hottest Goth club to dance  
(from a handbill posted in downtown Columbus, 1996)
  - b. Illinois city rated as best to raise kids  
(headline from *Columbus Dispatch*, 8/27/97, 3A)

- c. It was the Fun House [nightclub] that the DJ named Jellybean discovered Madonna.  
(Casey Kasem on his Top 40 radio show, November, 1997)
- d. This is one event that I want my darling wife by my side.  
(Homer Simpson, from a 1996 episode of *The Simpsons*)
- e. This is the lowest price I've ever sold gold in my life!  
(Columbus, Ohio radio commercial, approx. September, 1997)

The first example can perhaps be disregarded if it is assumed that the writers are taking *dance* to be a transitive verb (in the same way as *shop* is often taken, as in *Thank you for shopping K-Mart*), and the second might simply be an example of omitted words in newspaper headlines, but the other examples are not so easily dismissed. What is especially interesting about (49c-e) is the fact that although these various nouns are being used as BNPA's in adverbial relatives, they cannot be used in non-relative BNPA settings, as demonstrated in (50):

- (50)
- c. \*Jellybean discovered Madonna the Fun House.
  - d. \*I want my darling wife by my side this event.
  - e. \*I've never sold gold this price in my life!

These last three examples cannot be dismissed as instances of antecedent-contained deletion (as could the often-heard *Your call will be answered in the order it was received [in]*, or parking-lot advice *Pull out at the angle you went in [at]*), since the missing preposition does not appear elsewhere in these sentences. Furthermore, the last example cannot even be placed in the place/time/manner categories of BNPA's that have been examined so far: it talks about price! Examples like these might simply be attributed to speaker error, but there is beginning to be enough of a body of data that further investigation could be warranted.

**APPENDIX:**  
**Constraints and sample lexical entries**

- (A) Semantics Principle for Head-Adjunct phrases (Kasper [1998])

$$\begin{array}{c} \text{hd adj-struct} \\ \left[ \begin{array}{c} \text{HEAD [1]} \\ \text{CONT [2]} \end{array} \right] \end{array} \Rightarrow \begin{array}{c} \text{ADJUNCT DAUGHTER} \quad \text{HEAD DAUGHTER} \\ \left[ \begin{array}{c} \text{HEAD} | \text{MOD} \left[ \begin{array}{c} \text{ARG [4]} \\ \text{ICONT [3]} \\ \text{ECONT [2]} \end{array} \right] \\ \text{CONT [3]} \end{array} \right] \left[ \begin{array}{c} \text{HEAD [1]} \\ \text{CONT [5]} \end{array} \right] \end{array}$$

- (B) Constraints for relative clauses (modeled on Kasper (1998) *intersective-adj*)

$$\text{rel-cl} \Rightarrow \left[ \begin{array}{c} \text{HEAD} | \text{MOD} \left[ \begin{array}{c} \text{ARG} | \text{CONT} \left[ \begin{array}{c} \text{INDEX [1]} \\ \text{RESTR [2]} \end{array} \right] \\ \text{ICONT [3]} \\ \text{ECONT} \left[ \begin{array}{c} \text{INDEX [1]} \\ \text{RESTR [2] \& [3]} \end{array} \right] \end{array} \right] \\ \text{CONT [3]} \end{array} \right]$$

- (C) Adjunct-Complement Addition Lexical Rule (ACALR)

$$\begin{array}{c} \text{verb} \\ \left[ \begin{array}{c} \text{VAL} \left[ \begin{array}{c} \text{SUBJ [3]} \\ \text{COMPS [10]} \end{array} \right] \\ \text{SS [1]} \left[ \begin{array}{c} \text{ARG-ST [2]} \\ \text{DEPS [3] \oplus [4]} \\ \text{CONT [5]} \end{array} \right] \end{array} \right] \end{array} \Rightarrow \begin{array}{c} \text{verb} \\ \left[ \begin{array}{c} \text{VAL} \left[ \begin{array}{c} \text{SUBJ [3]} \\ \text{COMPS [8]} \end{array} \right] \\ \text{ARG-ST [2]} \\ \text{SS [7]} \left[ \begin{array}{c} \text{DEPS [3] \oplus [4] \oplus [7]} \left\langle \begin{array}{c} \text{MOD} \left[ \begin{array}{c} \text{ARG [1]} \\ \text{ICONT [9]} \\ \text{ECONT [6]} \end{array} \right] \\ \text{CONT [9]} \end{array} \right\rangle \\ \text{CONT [6]} \end{array} \right] \end{array} \right] \end{array}$$

$[4] = [10] \circ \text{list}(\text{gap-ss})$ 
 $[4] \oplus ([7]) = [8] \circ \text{list}(\text{gap-ss})$

- (D) Sag's constraints for *simple-inf-rel-cl*, incorporating Kasper's MOD structure.  
 (Unification of constraints for *hd-ph*, *hd-nex-ph*, *hd-comps-ph*, *clause*, *rel-cl*,  
*non-wh-rel-cl*, *simple-inf-rel-cl*; author's additions in boldface)

<i>simple-inf-rel-cl</i>	
HEAD [1]	$\left[ \begin{array}{l} \text{comp} \\ \text{VFORM inf} \\ \text{MC -} \\ \text{INV -} \\ \text{MOD ARG N' [HEAD [3], CONT [4]]} \end{array} \right]$
SUBJ [2]	<b>PRO</b>
COMPS	$\langle \rangle$
REL	{ }
QUE	{ }
CONT [5]	<i>hypothetical</i>
HD-DTR	$\left[ \begin{array}{l} \text{HEAD [1]} \\ \text{SUBJ [2]} \\ \text{COMPS } \langle [6], \dots, [n] \rangle \\ \text{CONT [5]} \\ \text{SLASH / } \{ \text{NP [HEAD [3], CONT [4]]} \} \\ \text{REL } \{ \} \\ \text{QUE } \{ \} \end{array} \right]$
NON-HD-DTRS	$\langle [\text{SYNSEM [6]}], \dots, [\text{SYNSEM [n]}] \rangle$

- (E) Constraints for *gapless-inf-rel-cl*

This type is to appear in the hierarchy as a subsort of *simple-inf-rel-cl*, and was created here in order to handle infinitival relatives headed by *reason*, which does not create a gap in the modifying infinitive phrase. As a type of *simple-inf-rel-cl*, this type will satisfy all the constraints in (G) except that the default SLASH value in the HD-DTR (denoted by the / in (G)) will be overridden as follows:

<i>gapless-inf-rel-cl</i>
HD-DTR [SLASH { }]

## (F) Lexical entries for several BNPA words (following (Kasper 1998))

$\left[ \begin{array}{l} \text{PHON} \langle \textit{place} \rangle \\ \\ \text{HEAD}   \text{MOD} \left( \begin{array}{l} \text{ARG}   \text{CONT} [4] \left[ \begin{array}{l} \textit{psoa} \\ \text{LOCATION} [3] \end{array} \right] \\ \text{ICON}   \text{INDEX} [3] \\ \text{ECON} [4] \end{array} \right) \vee \textit{none} \\ \\ \text{CONT} \left[ \begin{array}{l} \text{INDEX} [1] \\ \text{RESTR} \left[ \begin{array}{l} \textit{place} \\ \text{INST} [1] \end{array} \right] \end{array} \right] \\ \\ \text{SPR} \langle \textit{DetP} \rangle \end{array} \right]$	$\left[ \begin{array}{l} \text{PHON} \langle \textit{day} \rangle \\ \\ \text{HEAD}   \text{MOD} \left( \begin{array}{l} \text{ARG}   \text{CONT} [4] \left[ \begin{array}{l} \textit{psoa} \\ \text{LOCATION} [3] \end{array} \right] \\ \text{ICON}   \text{INDEX} [3] \\ \text{ECON} [4] \end{array} \right) \vee \textit{none} \\ \\ \text{CONT} \left[ \begin{array}{l} \text{INDEX} [1] \\ \text{RESTR} \left[ \begin{array}{l} \textit{day} \\ \text{INST} [1] \end{array} \right] \end{array} \right] \\ \\ \text{SPR} \langle \textit{DetP} \rangle \end{array} \right]$
---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

$$\left[ \begin{array}{l} \text{PHON} \langle \textit{way} \rangle \\ \\ \text{HEAD} | \text{MOD} \left( \begin{array}{l} \text{ARG} \left[ \begin{array}{l} \textit{VP} \\ \text{CONT} [4] \textit{psoa} \end{array} \right] \\ \text{ICON} | \text{RESTR} [2] \\ \text{ECON} [2] \textit{psoa} \end{array} \right) \vee \textit{none} \\ \\ \text{CONT} \left[ \begin{array}{l} \text{INDEX} [1] \\ \text{RESTR} \left[ \begin{array}{l} \textit{way} \\ \text{INST} [1] \\ \text{ARG} [4] \end{array} \right] \end{array} \right] \\ \\ \text{SPR} \langle \textit{DetP} \rangle \end{array} \right]$$

(H) Lexical entry for *reason*

PHON	$\langle \text{reason} \rangle$
COMPS	$\left\langle \left[ \left[ \text{VFORM inf} \right] \right] \right\rangle$
	$\left\langle \left[ \text{CONT } [2]_{\text{psoa}} \right] \right\rangle$
CONT	$\left[ \text{INDEX } [1] \right]$
	$\left[ \text{RESTR } \left[ \text{INST } [1] \right] \right]$
	$\left[ \text{ARG } [2] \right]$
SPR	$\langle \text{DetP} \rangle$

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